

Election Systems & Software Unity 3.2.0.0 Voting System VSTL Certification Test Plan

Prepared for
Election Systems & Software
11208 John Galt Blvd. Omaha, NE 68137
EAC Application # ESS0701

Version 2.0

| Trace to Standards | | | |
|--|-----------------|--------|--------------------|
| NIST Handbook 150-22 | | | |
| 4.2.3, 5.3.5, 5.3.6, 5.4.2, 5.4.6, 5.5.1, 5.7 thru 5.7.3 | | | |
| HAVA | | | |
| 301 | | | |
| VVS | | VSG | |
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| 1 | 9.6.2.1 | 2 | 1.8.2.1 |
| 2 | 2, 3, 4, 5, & 6 | 2 | 2, 3, 4, 5, & 6 |
| 2 | Appendix A | 2 | Appendix A |

iBeta Quality Assurance is accredited for Voting System Testing:

U.S. Election Assistance Commission

VSTL

EAC Lab Code: 0702
Effective thru 2/28/2009



NVLAP LAB CODE 200749-0

3131 South Vaughn Way, Suite 650, Aurora, Colorado, 80014

| Version History | | | | |
|-----------------|---|---|-------------------------------|---------|
| Ver # | Description of Change | Author | Approved by | Date |
| v.1.0 | Initial release to the EAC | Jenn Garcia, Kelly Swift, & Carolyn Coggins | Carolyn Coggins & Sue Munguia | 3/10/09 |
| V2.0 | Significant changes are identified in blue text: Section 1.1.2 Exclusion of Enhanced AutoCast Table 4 & 10 - Adobe Acrobat & Audit manager version updated Table 11- DS200 v.1.2.1 changes identified & VAT SN: AM0208470815 added Section 4.3.5 clarify SW test case design Section 7 Test Methods: Inserted reference to EAC provided documentation for reuse Section 8.4 Corrected- 1 C to 3 C Section 10EAC provided statement of reuse process Corrected grammatical or spelling errors were not highlighted as significant. | Carolyn Coggins & Jenn Garcia | Carolyn Coggins & Sue Munguia | 4/3/09 |
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This Test Plan follows the format identified in Volume 2 Appendix A of the *Voting System Standards 2002*. There a slight differences to the format identified in Appendix A of the *EAC Voting System Test Laboratory Program Manual* and this Test Plan The table below is a traces to the manual.

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1 Introduction

This Test Plan identifies iBeta Quality Assurance's (iBeta) approach to VSTL Certification Testing of the Election System & Software (ES&S) Unity 3.2.0.0 voting system to the Voting System Standards 2002 (VSS 2002). The purpose of this plan is to document the scope and detail the requirements of certification testing tailored to the design and complexity of software being tested and the type of voting system hardware.

The ES&S Unity 3.2.0.0 voting system has been submitted to iBeta for testing to support ES&S' application # ESS0701 to the US Election Assistance Commission (EAC) for certification to the VSS 2002.

The Unity 3.2.0.0 is a paper-based voting system that includes the:

- Election management system election (EMS) preparation software: Election Data Manager, ES&S Ballot Image Manager, Hardware Programming Manager, AutoMARK Information Management System
- EMS audit software: Audit Manager
- Pre-vote hardware: Ballot on Demand COTs printer
- Polling place optical scanner hardware and firmware: Model DS200
- Polling place ballot marker hardware and firmware: AutoMARK Voter Assist Terminal A100, AutoMARK Voter Assist Terminal Model A200
- Central count hardware and firmware: Model 650
- Central count EMS software: Election Reporting Manager

Due to the suspension of SysTest Labs (SysTest) in the middle of various Unity certification efforts, ES&S was authorized by the EAC to transfer their application for certification of the Unity 3.2.0.0 to iBeta. Unity 3.2.0.0 is a subset of paper ballot voting systems contained in the Unity v.4.0.0.0 voting system. At the time of the suspension the Unity v.4.0.0.0 test plan was approved by the EAC and a substantial amount of relevant testing had been successfully completed. ES&S petitioned the EAC to assess the testing performed by SysTest for consideration of reuse. The EAC approved the following assessment process:

- The EAC has authorized the reuse of the hardware testing conducted by SysTest sub-contractors. iBeta will review the reports to confirm any failures resulting in engineering changes are documented and the reports document that all hardware ultimately passed.
- iBeta will audit a sample of the Technical Data Package (TDP) submitted to and reviewed by SysTest and provide a recommendation to the EAC regarding the need to conduct a more comprehensive review of the TDP. The EAC shall issue a decision regarding reuse of the PCA Document Review.
- iBeta will conduct a 3% review of the ES&S source code. This review will focus on important functional sections of the code in order to determine the depth and focus of source review conducted by SysTest. iBeta will provide a recommendation to the EAC regarding the reuse of the source code review conducted by SysTest. The EAC will then issue a decision regarding the reuse of the source code review conducted by SysTest.
- The EAC Technical Reviewers will review and assess the Functional, Accessibility, Maintainability, Accuracy, and Reliability test summary reports provided by SysTest on the DS200, M650, AutoMARK VATs, Ballot-on-Demand printer, and Unity EMS software. The EAC will issue a decision regarding the reuse of this testing.
- SysTest did not complete Volume, Stress, Error Recovery and Security testing. iBeta will perform this testing on the DS200, M650, AutoMARK VATs, and Unity EMS software.
- While applicable areas from the Unity v.4.0.0.0 Test Plan may be used, iBeta must issue a Unity 3.2.0.0 test plan. The EAC will review and approve a full test plan provided by iBeta.
- SysTest shall provide the appropriate test summaries for all items that are accepted for reuse.

In a letter issued February 12, 2009 the EAC authorized the reuse of the functional, accessibility, maintainability, accuracy, and reliability testing conducted for Unity 3.2.0.0 base upon the EAC technical reviewer's audit of all test plans, test methods, test cases, and test results related to the scope of the Unity 3.2.0.0 test campaign. This included a review of a document created by SysTest Labs that

summarized all related testing conducted for the scope of the Unity 3.2.0.0 with the test results. The EAC concluded:

- All functional, accessibility, maintainability, accuracy, and reliability testing outlined in the approved SysTest Unity 4.0 test plan is approved for reuse in the Unity 3.2.0.0 test campaign.
- As part of the remaining testing the EAC is tasking iBeta with testing and verifying that the Unity 3.2.0.0 system is in compliance with EAC RFI 2008-07 "0' count to start the election". This testing should be reflected in the test plan being developed by iBeta for the Unity 3.2.0.0 system.
- iBeta is also tasked with testing and resolving the discrepancies listed by SysTest under the following tests: GEN 02 – Straight Party, GEN 03 – Add Languages, and PR101 – Pick-a-Party tests.

In a subsequent conversation with the EAC this last bullet was clarified to the open functional discrepancies identified in Table 5.

Non-core hardware environmental testing is outside SysTest's test accreditation scope as a VSTL. SysTest's methods for validating the qualifications of the subcontractor laboratories was provided to the EAC and considered in their decision to permit reuse of the non-core environmental testing. SysTest conducted the non-core safety and hardware environmental assessments and testing with the following subcontractors:

- Compliance Technology Services 1820 Skyway Drive Unit J, Longmont, Colorado 80504
- Components Reliability & Safety 1955 West 153rd Place, Broomfield, CO 80020
- Criterion Technology 1350 Tolland Road, P.O. Box 489, Rollinsville, CO 80474
- Nebraska Center for Excellence in Electronics (NCEE) 4740 Discovery Dr., Lincoln, NE 68521
- Percept Technology Labs 4735 Walnut St. #E, Boulder, CO 80301
- Sun Advanced Product Testing (APT) 1601 Dry Creek Drive Suite 2000, Longmont, CO 80503
- Wyle Laboratories, 7800 Highway 20 West, Huntsville, AL, 35806

The Physical Configuration Audit (PCA) of the ES&S Unity 3.2.0.0 shall incorporate a PCA Document Review Assessment of the Unity v.4.0.0.0 Technical Data Package (TDP) and a 3% PCA Source Code Review Assessment. The results of these assessments with a recommendation shall be submitted to the EAC. The EAC will direct iBeta if the SysTest Labs PCA Document Review and PCA Source Code Review may be accepted for reuse.

A Functional Configuration Audit (FCA) of the Unity 3.2.0.0 shall include an EAC review of the Unity v.4.0.0.0 testing performed by SysTest to:

- The requirements of Voting System Standards 2002;
- The Unity v.4.0.0.0 specifications of the ES&S TDP; and
- The voting system requirements of section 301 of the Help American Vote Act (HAVA).

iBeta shall identify the scope of the Unity 3.2.0.0 volume, stress, error recovery, security testing and a single end-to-end system level functional test. We shall develop a test plan; customize test cases; manage the system configurations; execute tests, and analyze the test results.

This test plan contains:

- The voting system and the scope of certification testing;
- The pre-certification test approach and methods;
- The certification test hardware, software, references and other materials for testing;
- The certification test approach and methods;
- The certification test tasks and prerequisite tasks; and
- The certification resource requirements.

1.1 **Unity 3.2.0.0 Exclusions**

The following are excluded from the Unity 3.2.0.0 voting system.

As identified in the VSS2002 vol.1 section 4.1.2, software is excluded if it:

- Provides no support of voting system capabilities;
- Cannot function while voting system functionality is enabled; and
- Procedures are provided that confirm software has been removed, disconnected or switched.

1.1.1 Unity v.4.0.0.0 Scope Excluded from Unity 3.2.0.0

The Unity 4.0.0.0 items identified as exclusions are not contained in the Unity 3.2.0.0 system submitted for Certification under EAC Application # ESS0701.

- Hardware including related software/firmware and peripherals: Automated Bar Code Reader (ABCR), iVotronic DRE Precinct Tabulator, Model 100 Precinct Ballot Counter, the DS200 modem kit, and the M650 configured with a network card;
- EMS Software: Data Acquisition Manager and iVotronic Ballot Image Manager; and
- System functionality and maintenance: DRE, VVPAT
- Network functionality: Network data transmission for remote transmission of votes or consolidated results
- Language accessibility other than English and Spanish.

In an email dated October 15, 2008 the EAC granted permission for ES&S to reuse the Unity v.4.0.0.0 TDP if the documents bore a disclaimer outlining the uncertified functionality that was not part of the Unity 3.2.0.0 certification. As such the review of the document content related to the uncertified Unity v.4.0.0.0 functionality was excluded from this review.

In receiving the source code, documents and test artifacts from SysTest, iBeta determined if the material was in or out of the Unity 3.2.0.0 test scope. Items determined to be out of scope were stored without further examination. No out of scope hardware was received.

1.1.2 Unity 3.2.0.0 Other Exclusions

The following functions are excluded from Unity 3.2.0.0 voting system and are not tested in this certification effort.

- Provisional ballots: The handling of provisional ballots is procedural. There is no provisional ballot functionality.
- Transmission via Public Telecommunications: There is no transmission via public telecommunications. The DS200 modem is removed from this certification.
- Use of Wireless Communications : There is no use of wireless communications
- Shared Operating Environment: Unity 3.2.0.0 does not share an environment with other data processing functions.
- [Enhanced AutoCast: This AutoMARK functionality requires both PEB v.1.70 and Auto MARK FW v.1.4. That version of AutoMARK firmware is not supported in Unity 3.2.0.0.](#)

1.2 Internal Documentation

The documents identified below are iBeta internal documents used in certification testing

Table 1 Internal Documents

| Version # | Title | Abbv. | Date | Author |
|-----------|---|----------------------------------|-----------|-------------------------|
| v.07 | Voting Certification Master Services Agreement- Election Systems & Software | MSA contract | 11/15/08 | iBeta Quality Assurance |
| Rev 02 | Statement of Work No. 02 Commencement Phase: Assessment for Reuse and Reporting | SOW 2-02 | | iBeta Quality Assurance |
| Rev 01 | Statement of Work No. 03 Maximum Reuse Project Estimate | SOW 3-01 | | iBeta Quality Assurance |
| v.4.0 | C and C++ Review Criteria | | 11/17/08 | iBeta Quality Assurance |
| v.1.0 | Z80 Assembler Review Criteria | | 10/19/07 | iBeta Quality Assurance |
| v.2.0 | SQL Server Review Criteria | | 6/19/07 | iBeta Quality Assurance |
| v.0.1 | COBOL Review Criteria | | 12/4/08 | iBeta Quality Assurance |
| v.2.0 | Visual Basic Review Criteria | | 6/19/2007 | iBeta Quality Assurance |
| | ESS Source Code Review Letter | 3% Source Code Review Assessment | 1/16/09 | iBeta Quality Assurance |

| Version # | Title | Abbv. | Date | Author |
|-----------|--|--------------------------------|---------|-------------------------|
| | Unity 3.2 PCA Document Review Assessment | PCA Document Review Assessment | 1/14/09 | iBeta Quality Assurance |
| | ESS Unity 3.2 Code & Equipment Receipt | | 2/18/09 | iBeta Quality Assurance |
| | E001 through E039 Equipment Photos | Equipment Images | various | iBeta Quality Assurance |
| | Test Methods Unity 3.2.0.0 | | 3/2/09 | iBeta Quality Assurance |
| | Reuse Environmental Test Case -Unity 3.2 | | 2/15/09 | iBeta Quality Assurance |
| | Reuse Characteristics Test Case -Unity 3.2 | | 2/15/09 | iBeta Quality Assurance |
| | FCA Security Review Unity 3.2 | | 3/6/09 | iBeta Quality Assurance |
| | FCA Security Test - Unity 3.2 Windows Configuration Test steps | | 3/10/09 | iBeta Quality Assurance |
| | FCA Test Documents Review Unity 3.2 | | 1/16/09 | iBeta Quality Assurance |
| | FCA Volume 1 | | 3/10/09 | iBeta Quality Assurance |
| | FCA Volume 2 | | 3/10/09 | iBeta Quality Assurance |
| | FCA Volume 3 | | 3/10/09 | iBeta Quality Assurance |
| | FCA Volume 4 | | 3/10/09 | iBeta Quality Assurance |
| | FCA Volume 5 | | 3/10/09 | iBeta Quality Assurance |
| | FCA Volume 6 | | 3/10/09 | iBeta Quality Assurance |
| | FCA Volume 7 | | 3/10/09 | iBeta Quality Assurance |
| | FCA Volume 8 | | 3/10/09 | iBeta Quality Assurance |
| | FCA Volume 9 | | 3/10/09 | iBeta Quality Assurance |
| | FCA Volume 10 | | 3/10/09 | iBeta Quality Assurance |
| v.2.0 | Trusted Build Procedure | | 1/23/09 | iBeta Quality Assurance |
| | ES&S Unity 3.2.0.0 EAC Matrix | | 3/6/09 | iBeta Quality Assurance |

1.3 External Documentation

The documents identified below are external resources used to in certification testing.

Table 2 External Documents

| Ver. # | Title | Abbv. | Date | Author | Test Plan Attachment |
|----------|--|------------------------------|-----------|----------------------------|----------------------|
| | Help America Vote Act | HAVA | 10/19/02 | 107 th Congress | |
| 2006 Ed. | NVLAP Voting System Testing NIST Handbook 150 | NIST 150 | Feb. 2006 | NVLAP | |
| | NVLAP Voting System Testing NIST Handbook 150-22 | NIST 150-22 | Dec. 2005 | NVLAP | |
| | Federal Election Commission Voting System Standards | VSS | Apr. 2002 | FEC | |
| | Testing and Certification Program Manual | Certification Program Manual | 1/1/07 | EAC | |
| v.1.0 | Voting System Test Laboratory Program Manual | VSTL Program Manual | July 2008 | EAC | |
| v.5.2 | EAC Test Matrix template | | | EAC | |
| | EAC Decision on Request for Interpretation 2007-02, 2002 Voting Systems Standards, Vol. 1, Section 4.2.5 | Interpretation 2007-02 | 5/14/07 | EAC | |
| | EAC Decision on Request for Interpretation 2007-04, | Interpretation | 10/29/07 | EAC | |

| Ver. # | Title | Abbv. | Date | Author | Test Plan Attachment |
|---|--|------------------------|----------|--------------|----------------------|
| | 2005 VVSG Vol. 1 Section 3.1.3 | 2007-04 | | | |
| | EAC Decision on Request for Interpretation 2007-05, 2005 VVSG Vol. 1 Section 4.2.1 (Testing Focus and Applicability) | Interpretation 2007-05 | 11/6/07 | EAC | |
| | EAC Decision on Request for Interpretation 2007-06, 2005 VVSG Vol. 1 Section 4.1.1, 2.1.2c &f, 2.3.3.3o & 2.4.3c&d. (Recording and reporting undervotes) | Interpretation 2007-06 | 11/7/07 | EAC | |
| | EAC Decision on Request for Interpretation 2008-01, 2002 VSS Vol. II, 2005 VVSG Vol. II, Section 4.7.1 & Appendix C | Interpretation 2008-01 | 2/6/08 | EAC | |
| | EAC Decision on Request for Interpretation 2008-02, Battery Backup for Optical Scan Voting machines | Interpretation 2008-02 | 2/19/08 | EAC | |
| | EAC Decision on Request for Interpretation 2008-03 (Operating System Configuration) 2002 VSS Vol. 1: 2.2.5.3, 4.1.1, 6.2.1.1, Vol. 2: 3.5; 2005 VVSG Vol. 1: 2.1.5.2, 5.1.1, 7.2.1, Vol. 2: 3.5 | Interpretation 2008-03 | 10/3/08 | EAC | |
| | EAC Decision on Request for Interpretation 2008-04, 2002 VSS Vol. I, Section 2.3.1.3.1a 2005 VVSG Vol. II, Section 2.2.1.3a Ballot Production | Interpretation 2008-04 | 5/19/08 | EAC | |
| | EAC Decision on Request for Interpretation 2008-05 2002 VSS Vol. I, Section 3.4.2 2005 VVSG Vol. I, Section 4.3.2, Durability | Interpretation 2008-05 | 5/19/08 | EAC | |
| | EAC Decision on Request for Interpretation 2008-06, 2002 VSS Vol. I, Sections 3.2.2.4c, 3.2.2.5 2005 VVSG Vol. I, V. 1.0, Sections 4.1.2.4c (Electrical Supply), 4.1.2.5 (Electrical Power Disturbance) | Interpretation 2008-06 | 8/29/08 | EAC | |
| | EAC Decision on Request for Interpretation 2008-07; 2002 VSS Vol. I, Sections, 2.3.4, 2.3.5, 2.3.6, 2.4.1, 4.4.3, 9.4; 2002 VSS Vol. II, Sections, 3.3.1, 3.3.2; 2005 VVSG Vol. I, Sections, 2.2.4, 2.2.5, 2.2.6, 2.3.1, 5.4.3; 2005 VVSG Vol. II, Sections, 1.3, 3.3.1, 3.3.2 | Interpretation 2008-07 | 8/27/08 | EAC | |
| | EAC Decision on Request for Interpretation 2008-09 (Safety Testing) 2002 VSS Vol. I, Section, 3.4.8 2005 VVSG Vol. I, Section 4.3.8 | Interpretation 2008-09 | 8/25/08 | EAC | |
| | EAC Decision on Request for Interpretation 2008-10 (Electrical Fast Transient) 2005 VVSG Vol. I, Section 4.1.2.6 2005 VVSG Vol. II, Section 4.8 | Interpretation 2008-10 | 8/28/08 | EAC | |
| | EAC Decision on Request for Interpretation 2008-12 (Ballot marking Device/ Scope of Testing) 2005 VVSG Vol. 1: 2.1.5. System Audit 2005 VVSG Vol. 1: 2.1.5.2 Shared Computing Platform | Interpretation 2008-12 | 12/19/08 | EAC | |
| Unity 3.2.0.0 EAC Correspondence | | | | | |
| | 2002 VSS Supported Functionality Declaration Unity 3.2.0.0 | | 10/29/08 | ES&S | |
| | Unity 3.2.0.0 Implementation Statement | | 10/29/08 | ES&S | |
| | Unity 3.2.0.0 Modules | | No date | ES&S | |
| | ESS Request to Change VSTL Unity 3.2 10.31.08 | | 10/31/08 | ES&S | |
| | SysTest iBeta Notice Ltr 11_21_08 | | 11/21/08 | ES&S | |
| | EAC Permission to Change VSTL Letter 11.18.08 | | 11/18/08 | EAC | |
| Unity v.4.0.0.0 Reuse Correspondence | | | | | |
| | Email: Reuse of Previous Testing for Unity 3.2.0.0 | | 11/21/08 | EAC | |
| | 2-3-2009 Letter to ESS Reuse of Testing Final | | 2/3/09 | EAC | |
| | 2-3-2009 Approval Reuse of Testing Final | | 2/3/09 | EAC | |
| | 2-12-09 Approval Reuse of Testing Functional FINAL | | 2/12/09 | EAC | |
| Unity v.4.0.0.0 Test Documents | | | | | |
| Rev.10.0 | ES&S Unity 4.0 Certification Test Plan Document Number 07-V-ESS-035-CTP-01 | | 12/9/08 | SysTest Labs | |
| Rev.0.2 | Voting System Test Summary Report, Test Report for testing through 10/22/08 for ES&S Unity 4.0 Voting System, Report Number 01-V-ESS-035-CTP-01 | | 12/19/08 | SysTest Labs | |

| Ver. # | Title | Abbv. | Date | Author | Test Plan Attachment |
|--------|--|-------|-----------|---------------------------------------|---------------------------|
| | Unity 4.0 Disc Rpt 10-28-08 | | 10/28/08 | SysTest Labs | |
| v.1.16 | Retest Matrix v1.16 | | 11/24/08 | ES&S | |
| | <i>Test Report No.- 080521-1251A</i> EMC Qualification Test Report ES&S AUTOMARK, VAT A200 | | 6/11/08 | Criterion Technology | |
| v.1.3 | AutoMARK Voter Assist Terminal Test Report | | 6/19/05 | Percept Technology Labs | Rev 6G: Other Lab Reports |
| | <i>Test Report No.- 041223-857</i> EMC Qualification Test Report AutoMARK Technical Systems, LLC VAT | | 1/31/05 | Criterion Technology | |
| | <i>Test Report No. - 04-00542</i> Testing Services Report AutoMARK VAT SN:002 | | 1/14/05 | APT | |
| | <i>Test Report No. 48489-08</i> Hardware Qualification Report of the ES&S M650 Central Ballot Counter Firmware Release 2.0.1.0 | | 1/7/05 | | |
| Rev. 1 | <i>Test Report No.- ATS-0501-R01-Rev.1</i> Electrical Safety Testing to UL 60950-1 (Replaces #ATS-0501-R01, dated 4/30, 2005) | | 4/10/06 | AutoMARK Technical Systems | |
| v.1.4 | Operational Status Check Test Case (ATS VAT) | | 1/11/2005 | SysTest Labs | |
| | <i>Test Report No.- 080327-1225</i> EMC Qualification Test Report AutoMARK, VAT A100 | | 4/21/08 | Criterion Technology | |
| | <i>Test Report No.- 070730-1165</i> EMC Qualification Test Report AutoMARK Technical Systems, LLC. Ballot Marking Device, VAT A300 | | 8/9/07 | Criterion Technology | |
| v.1.0 | AutoMARK Voter Assist Terminal 1.1 Test Report | | 1/4/06 | Percept Technology Labs | |
| Rev. 2 | VAT Accuracy Test Case Status Report | | | SysTest Labs | |
| | <i>Test Report No.- 070730-1165</i> DS200 Scanner EMC Test Report | | 7/31/07 | NCEE | |
| | <i>Test Report No.- R071107-30-01B</i> DS200 Scanner EMC Test Report (Amended with Original) | | 5/27/08 | NCEE | |
| | <i>Test Report No.- 070314-1134A</i> EMC Qualification Test Report ES&S DS200 Ballot Scanner with Optional 76246 Ballot Box | | 5/15/07 | Criterion Technology | |
| | <i>Test Report No.- 080521-1244</i> EMC Qualification Test Report ES&S Precinct Count Ballot Scanner, DS200 | | 6/18/08 | Criterion Technology | |
| | <i>Test Report No.- 07-00231</i> Testing Services Report DS200 Scanner and Ballot Box (Temp and Humidity) | | 4/16/07 | APT | |
| | <i>Test Report No.- 07-00207</i> Testing Services Report DS200 Scanner and Ballot Box (Vibration) | | 4/25/07 | APT | |
| v.1.0 | DS200 Op Stat Check v1.0 | | 11/21/08 | SysTest Labs | |
| v.1.0 | ES&S Unity 3.2.0.0 DS200 and Ballot Box and Voting System Test Report | | 5/1/07 | Percept Technology Labs | |
| v.1.0 | DS200 with Optional Ballot Box ESD Test Report | | 4/25/07 | Percept Technology Labs | |
| | <i>Test Report No.- ESS-0802-R04</i> Summary Test Report Physical Stability Testing to UL 60950-1 | | 2/ 12/08 | Components Reliability & Safety, Inc. | |
| | <i>Test Report No.- 07-1001-A</i> Product Safety Testing and Evaluation for Ballot Reader Model number DS200 with or w/o ballot box | | 4/27/07 | Components Reliability & Safety, Inc. | |
| | DS200 Accuracy Test Summary | | 4/21/08 | SysTest Labs | |
| | <i>Test Report No.- 0806-R05</i> Electrical Safety Testing to UL 60950-1:2007 | | 7/28/08 | Compliance Integrity Services | |
| | <i>Test Report No.- R071107-30-02</i> EMC Test Report (M650) | | 7/31/07 | NCEE | |
| | Unity 4.0 Certification Test Plan Rev 6.0 Attachment E Test Case Matrix 10071228 | | | | Rev 6 -E: TC Matrix |

| Ver. # | Title | Abbv. | Date | Author | Test Plan Attachment |
|--------|---|-------|---------------|--------------|------------------------------|
| | Test Report No.- 08-00654 Testing Services Report (M650) | | 5/2/08 | APT | |
| v.1.1 | M650 with Attached Printers Test Report | | 3/ 7/08 | SysTest Labs | |
| v.1.3 | M650 with Epson Printer Test Plan | | 7/31/07 | SysTest Labs | Rev 6- D: HW Test Plans |
| v.1.1 | DS200 Scanner EMC Test Plan | | 7/30/07 | SysTest Labs | Rev 6- D: HW Test Plans |
| Rev.01 | Certification Test Plan ESS HW Test Matrix | | 2/1/08 | SysTest Labs | Rev 6- D: HW Test Plans |
| Rev03 | Rev03_Model650_TDP06202007 | | | SysTest Labs | Rev6 F-2: Code Disc 12/27/07 |
| Rev05 | Rev05_AuditManager_TDP07312007 | | | SysTest Labs | Rev6 F-2: Code Disc 12/27/07 |
| Rev05 | Rev05.DAM_TDP09262007_ESS | | | SysTest Labs | Rev6 F-2: Code Disc 12/27/07 |
| Rev09 | Rev09.HPM_TDP09122007_ESS | | | SysTest Labs | Rev6 F-2: Code Disc 12/27/07 |
| Rev02 | Rev.02_CF_Utility_TDP05072007 | | | SysTest Labs | Rev6 F-2: Code Disc 12/27/07 |
| Rev03 | Rev03.ERM_TDP08082007_ESS | | | SysTest Labs | Rev6 F-2: Code Disc 12/27/07 |
| Rev03 | Rev03.EDM_BallotDataManager_TDP08012007_ESS | | | SysTest Labs | Rev6 F-2: Code Disc 12/27/07 |
| Rev03 | Rev03.DS200_TDP09072007_ESS | | | SysTest Labs | Rev6 F-2: Code Disc 12/27/07 |
| Rev02 | Rev02.ESSZIP_TDP07062007 | | | SysTest Labs | Rev6 F-2: Code Disc 12/27/07 |
| Rev02 | Rev.02_GetAuditData_TDP04022007 | | | SysTest Labs | Rev6 F-2: Code Disc 12/27/07 |
| Rev02 | Rev.02_MPRBOOT_TDP05162007 | | | SysTest Labs | Rev6 F-2: Code Disc 12/27/07 |
| Rev02 | Rev.02_SHELL_TDP05072007 | | | SysTest Labs | Rev6 F-2: Code Disc 12/27/07 |
| Rev03 | Rev.03_CB_EAGL_TDP05312007 | | | SysTest Labs | Rev6 F-2: Code Disc 12/27/07 |
| Rev03 | Rev.03_MAKEIBIN_08072007_ESS | | | SysTest Labs | Rev6 F-2: Code Disc 12/27/07 |
| Rev04 | Rev.04_ESSEAGL_TDP07202007_ESS | | | SysTest Labs | Rev6 F-2: Code Disc 12/27/07 |
| Rev04 | Rev.04_REGUTIL_TDP5312007 | | | SysTest Labs | Rev6 F-2: Code Disc 12/27/07 |
| | Engineering Change Evaluation & Reviews for the DS200 ECOs 690 to 693 & 702 to 706 (multiple documents) | | Various dates | SysTest Labs | |
| | Non-conforming Work & Corrective Action Request | | 1/18/05 | Percept | |

| Ver. # | Title | Abbv. | Date | Author | Test Plan Attachment |
|--------|---|-------|---------------|-----------------|----------------------|
| | SN008 (for VAT A100 ECO #0025) | | | Technology Lab | |
| | Engineering Change Evaluation & Review for the VAT A200 References 200-206,208, 2 10-247, 256-278, 324-346. | | Various dates | SysTest Labs | |
| A | Engineering Specification -Model PW-080A2-1Y24AP (G) -(DS200 -ferrite molded power supply) | | 2/3/09 | Wall Industries | |

1.4 Technical Data Package Documents

The Technical Data Package Documents submitted for this certification test effort is listed below.

Table 3 Voting System Technical Data Package Documents

| Document | Version | Date | Author |
|--|---------|----------|--------|
| System Security Test Cases | 4.0 | 09/02/08 | ES&S |
| System Security Test Procedure | 3.0 | 09/02/08 | ES&S |
| Election Systems & Software, Inc. Indented Bill of Material | None | 05/15/08 | ES&S |
| Adobe Installation Reference Guide | None | 05/28/08 | ES&S |
| AIMS Requirements Trace Matrix | 1.0 | 04/06/06 | ATS |
| AutoMARK Information Management System AIMS Release Notes | 9.0 | 08/16/07 | ATS |
| AutoMARK Information Management System (AIMS) System Overview | 4.0 | 05/14/07 | ATS |
| AutoMARK Information Management System (AIMS) System Functionality | 4.0 | 01/11/08 | ATS |
| AIMS Hardware Specifications | 3.0 | 04/20/07 | ATS |
| Compact Flash Memory Card Design Specifications | 3.0 | 05/01/07 | ATS |
| AutoMARK Information Management System (AIMS) Programming Specifications Details | 2.0 | 04/23/07 | ATS |
| AutoMARK Information Management System (AIMS) Software Design Specifications | 4.0 | 01/11/08 | ATS |
| AutoMARK Information Management System Election Official's Guide | 12.0 | 03/21/08 | ATS |
| AutoMARK INFORMATION MANAGEMENT SYSTEM SYSTEM OPERATIONS PROCEDURES | 4.0 | 04/23/07 | ATS |
| AutoMARK Information Management System (AIMS) System Security Specifications | 3.0 | 05/01/07 | ATS |
| AutoMARK Information Management System Quality Assurance Policy & Procedures | 4.0 | 01/11/08 | ATS |
| AIMS Quality Assurance Test Cases | 5.0 | 03/07/08 | ATS |
| AIMS Quality Assurance Test Procedures | 3.0 | 04/25/07 | ATS |
| AIMS Configuration Management Plan | 3.0 | 04/25/07 | ATS |
| AIMS System Change Notes | 17.0 | 06/08/07 | ATS |
| Audit Manager Test Case Specifications | None | 08/26/08 | ES&S |
| Audit Manager 7.5.0.0 Relational Model | None | None | ES&S |
| Setting the Date and Time on an AutoMARK | None | 05/13/08 | ES&S |
| ATS Component Storage and Handling Procedure | 3.0 | 09/02/08 | ES&S |
| ATS Configuration Management Policy | 3.0 | 09/02/08 | ES&S |
| Corrective Action Control Log | 1.0 | None | ES&S |
| Design Review Attendance Sheet | 1.0 | None | ES&S |
| Design Review Minutes | 1.0 | None | ES&S |
| Automark Design Review Policy | 3.0 | 09/02/08 | ES&S |
| ATS Document Change Order | 1.0 | None | ES&S |
| ATS Document Change & Issue Procedure | 4.0 | 09/02/08 | ES&S |
| Document Change Pending Re-Release | 1.0 | None | ES&S |
| ATS Document Control Policy | 3.0 | 09/02/08 | ES&S |
| ATS Employee Training Procedure | 3.0 | 09/02/08 | ES&S |
| Engineering Change Order/Change Request Form | 1.0 | None | ES&S |
| ATS Engineering Change Request/Change Order Process | 4.0 | 09/02/08 | ES&S |
| ATS Engineering Development Policy | 3.0 | 09/02/08 | ES&S |
| ATS Purchasing Procedure | 3.0 | 09/02/08 | ES&S |
| ATS Quality Assurance Policy | 3.0 | 09/02/08 | ES&S |
| ATS Quality System Audit Process | 3.0 | 09/02/08 | ES&S |

| Document | Version | Date | Author |
|--|---------|----------|--------|
| ATS Receiving Procedure | 3.0 | 09/02/08 | ES&S |
| ATS Software and Hardware Release Process | 8.0 | 09/02/08 | ES&S |
| System Bug Report Form | 1.0 | None | ES&S |
| ATS System Report (Bug Reporting) Procedure | 3.0 | 09/02/08 | ES&S |
| Audit Manager Checklist-Election Day Training Manual | None | 08/2007 | ES&S |
| ATS Quality System Master Audit Schedule | 1.0 | 09/02/08 | ES&S |
| Ballot Image Processing Specifications | 4.0 | 09/02/08 | ES&S |
| AutoMARK™ Ballot Scanning and Printing Specification | 3.0 | 09/02/08 | ES&S |
| AutoMARK Configuration Management Plan (AQS) -13-5020-000-F | 4.0 | 09/02/08 | ES&S |
| AutoMARK Driver API Specification | 3.0 | 09/02/08 | ES&S |
| Automark Environmental Test Cases | 5.0 | 09/02/08 | ES&S |
| AutoMARK Environmental Test Plan | 5.0 | 09/02/08 | ES&S |
| AutoMARK Environmental Test Procedures | 5.0 | 09/02/08 | ES&S |
| AutoMARK Graphical User Interface Design Specifications | 3.0 | 09/02/08 | ES&S |
| Initial Software Installation Procedure | 3.0 | 09/02/08 | ES&S |
| ES&S AutoMARK Jurisdiction Guide | 7.0 | 03/20/08 | ES&S |
| AutoMARK Operating Software (AMOS) Design Specifications | 3.0 | 09/02/08 | ES&S |
| AutoMARK Operations and Diagnostic Log Specifications | 4.0 | 09/02/08 | ES&S |
| Operations and Diagnostic Log Test Cases | 4.0 | 09/02/08 | ES&S |
| Operations & Diagnostic Log Test Procedures | 4.0 | 09/02/08 | ES&S |
| Personnel Deployment and Training Requirements | 4.0 | 09/02/08 | ES&S |
| ES&S AutoMARK Pollworker's Guide | 8.0 | 03/20/08 | ES&S |
| AutoMARK Programming Specifications Details | 5.0 | 09/02/08 | ES&S |
| ATS Quality System Procedures (QSP) Master List | 1.0 | 09/02/08 | ES&S |
| AutoMARK Rapid Application Development Methodology (RAD) | 4.0 | 09/02/08 | ES&S |
| AutoMARK 3010 VAT Release Notes | 12.0 | 09/02/08 | ES&S |
| AutoMARK Requirements Trace Matrix | 2.0 | 09/02/08 | ES&S |
| AutoMARK Software Design Specifications | 4.0 | 09/02/08 | ES&S |
| AutoMARK Software Development Environment Specifications | 4.0 | 09/02/08 | ES&S |
| AutoMARK Software Diagnostics Specification | 4.0 | 09/02/08 | ES&S |
| Software Standards Specification | 4.0 | 09/02/08 | ES&S |
| AutoMARK Software Quality Assurance Test Plan | 4.0 | 09/02/08 | ES&S |
| Software Quality Assurance Test Cases | 6.0 | 09/02/08 | ES&S |
| Software Quality Assurance Test Procedures | 4.0 | 09/02/08 | ES&S |
| AutoMARK System Change Notes | 90.0 | 09/02/08 | ES&S |
| AutoMARK System Functionality | 4.0 | 09/02/08 | ES&S |
| ES&S AutoMARK System Installation and Maintenance Guide | 9.0 | 03/24/08 | ES&S |
| AutoMARK System Introduction | 3.0 | 09/02/08 | ES&S |
| System Level Test Cases | 5.0 | 09/02/08 | ES&S |
| AutoMARK System Level Test Plan | 5.0 | 09/02/08 | ES&S |
| AutoMARK System Level Test Procedures | 4.0 | 09/02/08 | ES&S |
| AutoMARK System Security Specifications | 4.0 | 09/02/08 | ES&S |
| AutoMARK System Overview | 4.0 | 09/02/08 | ES&S |
| AutoMARK™ TECHNICAL DATA PACKAGE TABLE OF CONTENTS | None | 09/02/08 | ES&S |
| ES&S AutoMARK Voter's Guide | 8.0 | 03/20/08 | ES&S |
| AUTOMARK™ EMBEDDED DATABASE INTERFACE SPECIFICATION | 5.0 | 09/02/08 | ES&S |
| AutoMARK System Hardware Specification | 3.0 | 09/02/08 | ES&S |
| AutoMARK VAT Software and Firmware Compilation Instructions | 12.0 | 05/27/08 | ES&S |
| ES&S Ballot Production Handbook | None | 07/17/07 | ES&S |
| Ballot Data File Specification Unity Version 4.0.0.0 | 1.0 | 04/30/07 | ES&S |
| ES&S Ballot On Demand Printer Setup and Printing Procedures Version Release 7.7.0.0 Okidata part number 58273508 | None | 08/22/08 | ES&S |
| Ballot Set Collection File Specification Unity Version 4.0.0.0 | 1.0 | 04/30/07 | ES&S |
| Automark Technical Systems Integration & Testing Bug Report | 1.0 | None | ES&S |
| Development Practices and Coding Standards Election Systems and Software Version Number 2.3.0.0 | 2.3 | 07/11/08 | ES&S |
| DS 200 Part list | None | 05/12/08 | ES&S |
| DS200 Election Day Checklist Version Number 1.3.7.0 | None | 05/09/08 | ES&S |
| ES&S DS200 Power Management Board Validation | None | 08/01/08 | ES&S |
| DS200 Pre-Election Day Checklist Version Number 1.3.7.0 | None | 07/02/08 | ES&S |
| ES&S DS200 Scanner Board Dump Compare Hardware Version 1.2.1.0 | None | 09/26/08 | ES&S |

| Document | Version | Date | Author |
|--|---------|----------|--------|
| Firmware Version 2.0.0.0 | | | |
| DS200 Test Cases Unity 4.0 Version 1.3.7.0 | None | 06/13/08 | ES&S |
| Engineering Change of Order documentation | None | None | ES&S |
| Election Data Manager (EDM) Checklist-Election Day Training Manual | None | 08/2007 | ES&S |
| Election Data Manager Test Case Specifications Software Version 7.8.0.0 | None | 10/27/08 | ES&S |
| Election Data Manager 7.8.0.0 County Tables Relational Model | None | None | ES&S |
| Election Data Manager 7.8.0.0 Election Tables Relational Model | None | None | ES&S |
| EDMXML File Specification | None | 06/15/07 | ES&S |
| EL80 File Specification | None | None | ES&S |
| Election Reporting Manager Pre-Election Day Training Manual (Old version) | 1.0 | 02/29/08 | ES&S |
| Election Reporting Manager Pre-Election Day Training Manual Version Number 7.5.0.0 | None | 05/09/08 | ES&S |
| Election Reporting Manager / ERM Product Test Cases Unity 4.0 Version 7.5.2.0 | None | 10/23/08 | ES&S |
| ESS Hardware Acceptance Checklists | None | None | ES&S |
| ES&S License Agreements Software Development | None | 06/10/05 | ES&S |
| ESS Sample Deliverable Timeline | None | None | ES&S |
| ES&S Software/Firmware Acceptance | 1.0 | 02/25/08 | ES&S |
| ESSCRYPT Functional Specification Version 1.8.1.0 | None | 11/16/07 | ES&S |
| ESSDECPT Functional Specification Version 1.8.1.0 | None | 11/16/07 | ES&S |
| ESSHardware Revision History | None | 11/02/07 | ES&S |
| ESS Image Manager (ESSIM) Checklist-Election Day Training Manual | None | 08/2007 | ES&S |
| ESS Image Manager Test Case Specification Software Version 7.7.0.0 Test Case 2.0 | None | 10/17/08 | ES&S |
| ESSXML File Specification | None | 04/30/07 | ES&S |
| Hardware Revision Description | 1.0 | 08/27/07 | ES&S |
| Hardware Programming Manager (HPM) Checklist-Election Day Training Manual | None | 08/2007 | ES&S |
| Hardware Programming Manager Test Case 1.0 Unity Version 4.0 | None | 06/06/08 | ES&S |
| Interface (IFC) File Specification | None | None | ES&S |
| ISO Certification Pivot | None | None | ES&S |
| Ricoh Electronics Quality Manual | 4.0 | 07/06/06 | ES&S |
| Jurisdiction Security Procedures Version 1.0.0.1 | None | 05/09/08 | ES&S |
| Language Data File Specification | None | 04/30/07 | ES&S |
| Setting the Date and Time on a Model 100 Scanner | None | 05/13/08 | ES&S |
| Setting the Date and Time on a Model 650 Scanner | None | 05/13/08 | ES&S |
| Model 650 Output File Specification | None | None | ES&S |
| Setting the Machine ID on a Model 650 Scanner | None | 05/13/08 | ES&S |
| Model 650 Test Case Specification Firmware Version 2.2.1.0 Hardware Version 1.1 Test Case 1.0 | None | 10/17/08 | ES&S |
| OmniDrive USB/USB2 Installation Guide | 1.0 | 05/20/08 | ES&S |
| Open Source & 3rd Party Code Management Procedure | None | 01/03/06 | ES&S |
| Election Data Manager Training Manual Version Number 4.0.0.0 | 1.0 | 02/29/08 | ES&S |
| ESSIM Training Manual Version Number 4.0.0.0 | 1.0 | 02/29/08 | ES&S |
| Election Results Export (EXP) Election Day Checklist | None | 02/29/08 | ES&S |
| Hardware Program Manager Training Manual Version Number 5.7.0.0 | None | 05/09/08 | ES&S |
| Model 650 Election Day Checklist Version Number 2.2.1.0 | 1.0 | 02/29/08 | ES&S |
| Model 650 Pre-Election Day Checklist Version Number 2.2.1.0 | 1.0 | 02/29/08 | ES&S |
| Model 650 Handout A: Setting the Date & Time | None | 02/29/08 | ES&S |
| Product Release Request | None | None | ES&S |
| Quality Assurance Manual | K | 03/17/05 | ES&S |
| Trace to Vendor Testing and Technical Data Package | 05-01 | 12/01/08 | ES&S |
| QMI Management Systems Registration Certificate of Registration | None | None | ES&S |
| QMI Certificate of Registration | None | None | ES&S |
| RM/COBOL® Installation Guide | 1.1 | 05/20/08 | ES&S |
| ES&S Software Validation Phase I Create ES&S Preliminary Definition File | 1.1 | 04/10/08 | ES&S |
| ES&S Software Validation Phase II-Create ES&S Package Definition File-Using the ES&S Software Validation Utility | 1.2 | 04/10/08 | ES&S |
| ES&S Software Validation Phase III-ES&S Software Validation Procedure-Using the ES&S Software Validation Utility | 1.1 | 04/10/08 | ES&S |
| ES&S System Security Specification Version Release 4.0.0.0 | None | 07/08/08 | ES&S |

| Document | Version | Date | Author |
|---|---------|------------|--------|
| TDP Table of Contents and Abstracts | None | 05/28/08 | ES&S |
| ES&S DS200 System Maintenance Manual | 1.2.0 | 10/17/08 | ES&S |
| ES&S Configuration Management Plan | 1.0 | 10/28/08 | ES&S |
| System Change Notes | 1.0 | 11/25/08 | ES&S |
| System Limitations Election Systems and Software | None | 12/01/08 | ES&S |
| ES&S Quality Assurance Program Manufacturing | 1.0 | 11/21/08 | ES&S |
| ES&S Quality Assurance Program Software and Firmware | 1.0 | 11/25/08 | ES&S |
| ES&S Software Design Specifications Audit Manager | 1.0 | 11/14/08 | ES&S |
| ES&S Software Design Specifications DS200 | 1.0 | 11/14/08 | ES&S |
| ES&S Software Design Specifications Election Data Manager (EDM) | 1.0 | 11/17/08 | ES&S |
| ES&S Software Design Specifications v | 1.0 | 11/14/08 | ES&S |
| ES&S Software Design and Specification ES&S Ballot Image Manager (ESSIM) | 1.0 | 11/14/08 | ES&S |
| ES&S Software Design and Specification Hardware Programming Manager (HPM) | 1.0 | 11/14/08 | ES&S |
| ES&S Software Design Specifications Model 650 | 1.0 | 11/14/08 | ES&S |
| ES&S System Functionality Description Model 650 | 1.0 | 11/17/08 | ES&S |
| ES&S System Functionality Description Audit Manager | 1.0 | 11/17/08 | ES&S |
| ES&S System Functionality Description DS200 | 1.0 | 11/17/08 | ES&S |
| ES&S System Functionality Description EDM | 1.0 | 11/17/08 | ES&S |
| ES&S System Functionality Description ERM | 1.0 | 11/17/08 | ES&S |
| ES&S System Functionality Description ES&S Ballot Image Manager (ESSIM) | 1.0 | 11/17/08 | ES&S |
| ES&S System Functionality Description Hardware Programming Manager (HPM) | 1.0 | 11/17/08 | ES&S |
| ES&S System Hardware Specification DS200 | 1.0 | 11/17/08 | ES&S |
| ES&S System Hardware Specification Model 650 | 1.0 | 11/17/2008 | ES&S |
| ES&S Model 650 System Maintenance Manual Firmware Version 2.2.1.0 Hardware Version 1.1 and 1.2 | None | 10/17/08 | ES&S |
| ES&S Audit Manager System Operations Procedures Version Release 7.5.0.0 | None | 10/17/08 | ES&S |
| ES&S DS200 System Operations Procedures Hardware Version 1.2.1 Firmware Version 1.3.7.0 | None | 10/17/08 | ES&S |
| ES&S Election Data Manager System Operations Procedures Version Release 7.8.0.0 | None | 10/17/08 | ES&S |
| ES&S Election Reporting Manager System Operations Procedures Version Release 7.5.2.0 | None | 10/17/08 | ES&S |
| ES&S Image Manager System Operations Procedures Version Release 7.7.0.0 | None | 10/17/08 | ES&S |
| ES&S Hardware Programming Manager System Operations Procedures Version Release 5.7.0.0 | None | 10/17/08 | ES&S |
| ES&S Model 650 System Operations Procedures Firmware Version 2.2.1.0 Hardware Version 1.1 and 1.2 | None | 10/17/08 | ES&S |
| System Overview | 1.0 | 11/12/08 | ES&S |
| Unity System Test Plan | 1.0 | 11/20/08 | ES&S |
| ES&S Personnel Deployment and Training Recommendations | 1.0 | 11/21/08 | ES&S |
| Installation Guide Windows XP On Dell Optiplex GX520 | 1.2 | 05/21/08 | ES&S |
| Verify DS200 Operating System Using Open SSL | None | 09/19/08 | ES&S |
| VSTL Source Code Status Report | None | None | ES&S |
| Audit Manager Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| Build Procedure ESS Linux 6.2 Beyond Linux From Scratch (BLFS) | 2.0 | 04/25/08 | ES&S |
| CB_650 Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| CB_EAGL Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| CB_M100 Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| Build Procedure CB_PEB.DLL | 1.0 | 05/22/08 | ES&S |
| CB_RAND Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| Compact Flash Utility Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| Build Procedure PCCARD30.EXE | 2.0 | 05/21/08 | ES&S |
| CRCDLL Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| DS200 Firmware Backup to CompactFlash® | 1.0 | None | ES&S |
| DS200 Update Device Creation Procedure | 1.0 | None | ES&S |
| DS200 Update Device File Copy Procedure | 1.0 | None | ES&S |
| DS200 Operating System Installing/Replacing CompactFlash® Procedure | 1.0 | None | ES&S |

| Document | Version | Date | Author |
|---|---------|----------|--------|
| DS200 Touch Screen Calibration | 1.0 | None | ES&S |
| DS200 Firmware to USB Update Media File Copy Procedure | 1.0 | None | ES&S |
| Build Procedure DS200 Ancillary Devices | 1.2 | 04/28/08 | ES&S |
| Build Procedure DS200 Firmware | 2.0 | 04/28/08 | ES&S |
| ESS Linux 6.2 BLFS Target Operating System Build and Install Procedure Document Version 1.3.0.0 | None | 04/25/08 | ES&S |
| Election Data Manager Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| Election Packager Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| Build Procedure Election Reporting Manager Version 7.5.2.0 | None | 11/11/08 | ES&S |
| ERMDLL Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| ESSCrt1 Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| ESSCRYPT Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| ESS Decrypt Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| ESS Eagle Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| ESS Image Manager Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| Build Procedure ESSM100.DLL | 2.0 | 05/22/08 | ES&S |
| ESSPCMIO Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| Build Procedure ESSPEB.DLL | 1.0 | 05/22/08 | ES&S |
| ESSXML Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| ESSZIP Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| Events Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| ExitWin Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| Get Audit Data Utility Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| Build Procedure Hardware Programming Manager Version 5.7.0.0 | None | 05/06/08 | ES&S |
| HPMDLL Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| Images Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| InstallShield® Professional Installation Guide | 1.0 | None | ES&S |
| Installation Guide InstallShield® Express 2.1 | 1.0 | None | ES&S |
| InstallShield Professional Installation Guide | 1.0 | None | ES&S |
| RM/COBOL® Version 11.01 Development System and WOW Designer TM Version 11.01 | 2.0 | None | ES&S |
| Build Procedure ESS Linux 6.2 Linux From Scratch (LFS) | 2.0 | 04/24/08 | ES&S |
| ES&S Model 650 QNX Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| Makelbin Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| MFC SHARED Source Installation Guide | 1.1 | None | ES&S |
| MPRBOOT.HEX Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| MYDLL Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| Build Procedure PBMtoBMP.EXE | 2.0 | 05/20/08 | ES&S |
| RegUtil Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| Shell Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| ShellSetup Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| UndrVote Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| Build Procedure VioDialog.EXE | 2.0 | 05/21/08 | ES&S |
| VioWin Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| Visual Studio Professional Edition Installation Guide | 1.0 | None | ES&S |
| Installation Guide Visual Studio 2005, Professional Edition with Service Pack 1 | 1.1 | None | ES&S |
| Installation Guide Visual Studio 6.0, Enterprise Edition with Service Pack 5 | 1.2 | None | ES&S |
| Installation Guide Visual Studio 2005, Professional Edition without Service Pack 1 | 1.0 | None | ES&S |
| Win650 Build Environment Compile-Install Guide | 1.0 | None | ES&S |
| Installation Guide Windows XP On Corsair Orbit | 1.2 | 03/20/08 | ES&S |
| Installation Guide Windows XP On Corsair Orbit (no VGA Driver) | 1.2 | 05/22/08 | ES&S |
| Installation Guide Windows XP On Dell Optiplex GX520 | 1.2 | 04/24/08 | ES&S |

1.5 Terms and Definitions

The Terms and Definitions identified below are used in this test report.

Table 4 Terms and Definitions

| Term | Abbreviation | Definition |
|-----------------|--------------|---|
| Absentee Ballot | | A paper ballot cast outside of an early voting center or election day polling place |

| Term | Abbreviation | Definition |
|--|--------------|---|
| Adobe Acrobat Standard v.8 & v.9 | | COTS software used in ESSIM for creation of Portable Document Format (PDF) ballot files. |
| Audit Manager | AM | A Unity election management system audit logging software application for the Election Data Manager and Ballot Image Manager |
| Ballot Control - Accepts | | HPM option that instructs the DS200 to accept and tabulate overvoted, blank, primary crossovers or ballots with unreadable marks without alerting the voter. |
| Ballot Control- Query | | HPM option that instructs the DS200 to return and query the voter when encountering an overvoted, blank, primary crossovers or ballots with unreadable marks. Voter has the option to request a new ballot or instruct the system to accept the ballot as is. |
| Ballot Control - Reject | | HPM option that instructs the DS200 to automatically reject crossover, overvoted or blank ballots. Ballots will not be accepted. |
| Ballot Marking Device | BMD | A device that marks a paper ballot for a voter |
| Ballot On Demand | BOD | An optional operating mode in ESSIM that is used to print a small quantity of election quality ES&S paper ballots on a COTS OKI 9600 HDN color laser printer. |
| Certified Information System Security Profession | CISSP | A certification for information system security practitioners, indicating successful completion of the CISSP examination administered by the International Information Systems Security Certification Consortium |
| Central counter | | A type of voting system that records and reports paper ballots at the central count |
| Double Spit and Wipe | | Functionality on the VAT to support older ES&S optical scanners outside the scope of Unity 3.2.0.0 |
| Early voting mode - | | A mode on the DS200 that permits ballots to be cast prior to election day. A flag is set in HPM to include all precincts for the election. The poll-worker can select a voter's precinct and ballot style when used in Early Voting or an Absentee configuration. |
| Election Data Manager | EDM | A Unity election management system software application to define and store jurisdiction election data |
| Election Systems and Software | ES&S | Manufacturer of the Unity Voting System |
| Election management system | EMS | The ballot preparation and central count portions of a voting system. |
| Election Reporting Manager | ERM | A Unity central count software application to compile and report election results from Unity voting devices |
| Enhanced AutoCast | | Functionality for automatically dropping AutoMARK ballots into a ballot box. This functionality requires PEB FW v.1.70 and Auto MARK FW v.1.4. That version of AutoMARK firmware is not supported in Unity 3.2.0.0 |
| Escrow Agency | | EAC identified repository that retains the file signature of the trusted build |
| ES&S AutoMARK Information Management System | AIMS | A windows-based election management system software application to define election parameters for the VAT, including functionality to import election definition files produced by the Unity EMS and create VAT flash memory cards |
| ES&S Ballot Image Manager | ESSIM | A Unity election management system desktop publishing tool to layout and format paper ballots |
| Executable Lines of Code | eLOC | Lines of code that execute functionality. Comments and blank lines are excluded from counts of executable lines of code. |
| Flash Memory Card | FMC | Portable memory that contains the election definition to display the ballot content on a VAT. |
| Full or New Code Review | | First time submission submitted for certification review or previously certified code with changes to the code so significant that a full review is warranted. |
| Graphical User Interface | GUI | A method of interaction with a computer which uses pictorial buttons (icons) and command lists controlled |

| Term | Abbreviation | Definition |
|---|--------------|---|
| | | by a mouse |
| Hardware Programming Manager | HPM | A Unity election management system software application to import, format, and convert an election file and create election definitions for ballot scanning equipment |
| Help America Vote Act | HAVA | Legislation enacted in 2002 which includes creation of the EAC, federal voting standards and accreditation of test labs |
| intElect DS200 | DS200 | A Unity Voting System precinct count optical scanner paper ballot tabulator including a 12-inch touch screen display providing clear voter feedback and poll worker messaging. |
| Model 650 | M650 | A Unity Voting System central count high-speed optical scanner paper ballot tabulator The M650 prints results reports to an external printer and saves results to a zip disk. |
| National Standard Reference Library | NSRL | Part of NIST that provides software escrow. |
| National Voluntary Laboratory Accreditation Program | NVLAP | Part of NIST that provides third-party accreditation to testing and calibration laboratories. |
| Open Primary Pick a Party (Party Preference) | | Ballot contains all contests that the voter is eligible to vote for in addition to any nonpartisan contests. Voter only votes the partisan contests for one party but chooses which party in the privacy of the voting booth by only voting for candidates from the desired party. Pick a Party is where a party selection contest appears before the partisan section of the ballot. If the voter chooses a party from the party selection contest, votes for candidates that represent any other party are ignored so that the voter cannot spoil the ballot. |
| Precinct counter | | A type of voting system that records paper or electronic ballots at the polling place |
| Printer Engine Board version | PEB v. | The version of the firmware on the Printer Engine Board identifies support or non-support of Enhanced AutoCast and Double Spit & Wipe (v.1.70 supports) |
| Single Board Computer version | SBC v. | Version of the Single Board Computer identifying board connections and chips |
| Trusted Build | | A compile and build of the source code reviewed by iBeta into executable code. Construction of the build platform and compile is performed by iBeta following the documented instructions of the manufacturer. A manufacturer's representative is present to witness the build. |
| Technical Data Package | TDP | The documentation and code relating to the voting system, submitted by the manufacturer for review. |
| Universal Power Supply | UPS | Uninterrupted power supply |
| U.S. Election Assistance Commission | EAC | U.S. agency established by the Help America Vote Act of 2002 to administer Federal elections. |
| Voluntary Voting System Guidelines | VVSG | Federal voting system test standards created by the EAC. Eventually these will replace the VSS. |
| Voting System Standards | VSS | Federal voting system test standards, predecessor of the VVSG. |
| Voting System Test Lab | VSTL | Lab accredited by the EAC to perform certification testing of voting systems. |
| Voting Variations | | Significant variations among state election laws incorporating permissible ballot content, voting options and associated ballot counting logic |
| Voter Assist Terminal | VAT | A ballot marking device to assist multilingual voters and voters with visual, aural or dexterity disabilities to vote a paper ballots in a private manner |
| Unity x.x.x.x | | A voting system produced by ES&S configured with various election software applications, DREs, optical scanners and ballot marking devices. The configuration varies for each version of Unity. |

| Term | Abbreviation | Definition |
|---------------------------------|--------------|--|
| Witness Build for Unity 3.2.0.0 | | The Unity 4.0.0.0 Trusted Build performed by SysTest Labs. iBeta shall initiate testing with this build. Following iBeta's performance of the Trusted Build a regression test will be run. |

2 Pre-certification Tests

2.1 Pre-certification Test Activity & Test Results

The scope of the ES&S Unity 3.2.0.0 certification test effort resulted from the transfer of two EAC certification test efforts previously submitted for testing to SysTest Labs. ES&S' petition for consideration of reuse of SysTest Labs reviews and testing resulted in the identification of a unique set of pre-certification test activities. As noted in the section 1 Introduction responsibility for these activities was designated to either iBeta or the EAC. iBeta conducted a review of the test documentation provided by ES&S and SysTest Labs to assess the scope of testing for conformance to the 2002 VSS Environmental Hardware, Volume, Stress, Error Recovery, Telecommunication and Security requirements. Assessment and determination of the reuse of the Functional, Usability, Accessibility, Maintainability, Accuracy and Reliability testing was to be provided by the EAC.

iBeta's evaluation of prior Non-VSTL and VSTL testing and test results is listed below.

2.1.1 FCA Document Review & Results

iBeta initiated an assessment to identify and separate Unity v.4.0.0.0 hardware and software excluded from Unity 3.2, SysTest test results petitioned for reuse by ES&S, and items in scope of additional testing required in the Unity 3.2.0.0 certification test effort. Following the assessment a process for review was identified. This process and the results of the FCA Document Review are described below.

2.1.1.1 Identification of Out of Scope Unity v.4.0.0.0 Hardware & Software

Unity v.4.0.0.0 hardware and software excluded from the application for Unity 3.2.0.0 filed with the EAC was identified as out of scope for Unity 3.2.0.0 certification. This included: iVotronic Ballot Image Manager (iVIM); Data Acquisition Manager (DAM); iVotronic DRE precinct tabulator including the associated peripherals; Automatic Bar Code Scanner (ABCR); Model 100 precinct scanner (M100); and network data transmission, including remote transmission of vote data and/or consolidated results data.

FCA Document Review Result: All documentation of testing and review for these Unity v.4.0.0.0 hardware and software was excluded from examination in Unity 3.2.0.0 (see Table 6 Out of Scope & Non Issues).

2.1.1.2 Identification of Unity v.4.0.0.0 Hardware & Software Test Results Petitioned for Reuse

The components transferred for certification under Unity 3.2.0.0 included:

- Audit Manager (AM), v. 7.5.0.0;
- Election Data Manager (EDM), v. 7.8.0.0;
- ES&S Ballot Image Manager (ESSIM), v. 7.7.0.0;
- Ballot On Demand (BOD), v. 7.7.0.0;
- Hardware Programming Manager (HPM), v. 5.7.0.0;
- Election Reporting Manager (ERM), v. 7.5.2.0;
- ES&S AutoMARK Information Management System (AIMS), v. 1.3.57;
- AutoMARK Voter Assist Terminal (VAT), Model A100, HW v. 1.0 and A200, HW v. 1.0 and 1.1, Firmware v. 1.3.2904;
- intElect DS200 precinct count scanner (DS200), HW v. 1.2.0 and v. 1.2.1, FW v. 1.3.7.0, Power Management FW v. 1.2.0.0, Scanner FW v. 2.11.0.0;
- Model 650 central count scanner (M650), HW v. 1.1 and 1.2, FW v. 2.2.1.0.

ES&S petitioned the EAC for reuse of the application Unity v.4.0.0.0 test results. SysTest documented these results and provided them in their report *Voting System Test Summary Report, Test Report for testing through 10/22/08 for ES&S Unity 4.0 Voting System, Report Number 01-V-ESS-035-CTP-01, Rev 0.2, December 19, 2008*. This report documented their certification processes and testing performed including: "documentation review of the Technical Data Package, source code review, and testing... executing functional test cases based on the project test requirements, system level tests prepared by SysTest Labs and analysis of results." For the hardware and software identified above as in scope for Unity 3.2.0.0 iBeta reviewed the open discrepancies related to system functionality and

system changes submitted during the Unity v.4.0.0.0 test effort. A comparison of the versions submitted in the SysTest report and those identified discrepancies for Unity 3.2.0.0 was conducted to confirm if the versions being submitted for Unity 3.2.0.0 matched the versions that were tested in the Unity v.4.0.0.0 certification.

If the Unity version number of the submitted system changes was equal to or less than the version identified in the report it was excluded due to the petition for reuse of the SysTest results. If the open functional discrepancy was equal to the version or greater than the identified in the report it was included in the iBeta testing of Unity 3.2

FCA Document Review Result: It was found that SysTest Labs tested the versions identified in the System Changes. This resulted in the exclusion of the following discrepancies from the iBeta test scope: 499, 500, 501, 502, 504, 505, 506, 507, 508, 509, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 539, 540, 541, 542, 543, 544, and 546. Functional issues encountered in the versions identified in the report. This resulted in the inclusion of 411, 434, 453, 454, and 475 in the iBeta testing of Unity 3.2.0.0 (see Table 5 Unity 3.2.0.0 Applicable Discrepancies and Table 6 Out of Scope & Non Issues).

2.1.1.3 Identification of Unity 3.2.0.0 Additional Testing

The EAC approved a Unity v.4.0.0.0 Test Plan. At the time of the suspension of SysTest Labs they had completed System Level Functional, Usability, Accessibility, Maintenance, Data Accuracy, and Reliability. The Volume, Stress, Error Recovery and Security testing had not been completed. An FCA test documentation review was completed to determine the VSS requirements applicable to security, volume, stress, performance and recovery testing, as well as incorporation of the open in-scope functional discrepancies identified above. Following identification of the applicable requirements a review of the approved Unity v.4.0.0.0 was performed to identify the approved test methodology. This has been combined with an examination of the system limitations and security documentation provided to determine the required content of the Volume, Stress, Error Recovery and Security testing. External reports from the EAC of issues encountered by jurisdictions in Unity 3.2.0.0 were incorporated into the security review. These included attempting a malicious attack on an M650 zip disk and attempting to manipulate audit logs.

FCA Document Review Result: iBeta shall initiate Volume, Stress, Error Recovery and Security testing of the Unity 3.2.0.0. In 2-12-09 *Approval Reuse of Testing Functional FINAL* the EAC approved the reuse of the SysTest Labs System Level Functional, Usability, Accessibility, Maintenance, Data Accuracy, and Reliability testing..

2.1.2 PCA Document Review Assessment & Recommendation for Reuse

The audit of the ES&S Unity 3.2.0.0 Technical Data Package (TDP) was in accordance with the EAC instructions (see section 1 Introduction) for assessment and recommendation for reuse of the PCA Document Review (VSS vol. 2 section 2) conducted by SysTest Labs for Unity v.4.0.0.0 test effort.

iBeta sampled the ES&S Unity 3.2.0.0 documents. The sample selection included the documents identified in the SysTest Labs issued discrepancies and documents needed to complete the Unity 3.2.0.0 trusted builds, a sample 3% source code review, test planning and test execution. Criteria for the review included confirmation that the Unity 3.2.0.0 documents addressed any document discrepancies within the scope of the Unity 3.2.0.0 test effort and the content provided sufficient information in order to complete the test tasks list above.

2.1.2.1 Documentation of the Audit of the TDP

Due to the change of scope, many discrepancies issued by SysTest Labs were outside the scope of Unity 3.2.0.0. iBeta reviewed every open discrepancy. Issues, which were identified as all or partially relevant to the Unity 3.2.0.0 scope, were transferred to iBeta's *Unity 3.2.0.0 Discrepancy Report*. Issues or parts of issues, outside this scope were excluded. Scope assessment was recorded in a review disposition document. The transferred discrepancies identified location of the issue, SysTest Labs discrepancy number, and detail of the initial description from the SysTest Labs discrepancy report. iBeta confirmed the issues were valid and traced to an appropriate 2002 VSS requirement. iBeta

reviewed the SysTest Labs description history from the original SysTest Labs discrepancy report and the Unity 3.2.0.0 documents submitted by ES&S to validate resolution of the issue. In some instances discrepancies were incorporated into Unity 3.2.0.0 FCA.

The review of documents necessary to complete Unity 3.2.0.0 trusted builds, sample code review; test planning and test execution was incorporated into these tasks and recorded in the daily status. Missing content or discrepancies were reported in iBeta's *Unity 3.2.0.0 Discrepancy Report*. This report will be included as an appendix in the final VSTL Certification Test Report. Issues must be resolved and validated prior to the completion of certification testing.

Review of ES&S' Quality Assurance and Configuration Management documentation is part of the PCA Document Review. In addition to the build and installation process, iBeta observes the delivered materials, documents, hardware and software to confirm that ES&S' is consistent with their internal quality procedures and configuration management. The VSS tasks the VSTL with this observation during testing. Any inconsistencies identified by iBeta shall be noted as on the discrepancy report as informational. iBeta shall deem that ES&S follows their policies if no inconsistencies are identified during the test effort.

2.1.2.2 TDP Audit Results

The Unity 3.2.0.0 TDP submitted by ES&S was sufficient to close the majority of the document discrepancies deemed inside the scope of Unity 3.2.0.0. The

- One document issue remained open for additional clarification of the ES&S response;
- One document issue remained open for incorporation into the iBeta Security Review; and
- Four issues did not have a response from ES&S. As these were the last items on the list SysTest may not have submitted them to ES&S.

Review of documents necessary to perform Unity 3.2.0.0 trusted builds, sample 3% code review and test planning were generally found to contain the information needed to perform these task. Four issues were noted in the review were added to iBeta's *Unity 3.2.0.0 Discrepancy Report*.

- Document discrepancy #10 identified a gap in the Win650 build procedure;
- Document discrepancy #50 identified the System Overview and System Limitations do not reflect the language scope of Unity 3.2.0.0;
- Document discrepancy #52 identified System Overview contained a typo with an incorrect hardware version for the DS200; and
- Document discrepancy #53 identified the absence of the VATs and AIMS from the System Limitations.

The results and disposition of all SysTest Labs Unity v.4.0.0.0 issued discrepancies are provided below. Note: Functional discrepancies, which remain open for validation in the FCA, are also listed in the following table.

Table 5 Unity 3.2.0.0 Applicable Discrepancies

| Sys Test # | DS 200 | M 650 | VAT | EMS | Oth-er | iBeta # | Dispo-sition | Portion Excluded from Unity 3.2.0.0 | Out of Scope: Remains Open in Unity v.4.0.0.0 |
|------------|--------|-------|-----|-----|--------|---------|--------------|---|---|
| 6 | X | X | | | | 12 | Closed | M100 | Not reviewed |
| 23 | | | | | X | 13 | Closed | ABCR, Test Plan | Not reviewed |
| 24 | | | | | X | 14 | Closed | ABCR, Test Plan | Not reviewed |
| 26 | | X | | X | | 15 | Closed | M100, IVIM, IVO, ABCR | Not reviewed |
| 27 | X | X | | X | | 16 | Closed | IVIM, DAM, IVO, M100 | Not reviewed |
| 43 | | | | | X | 17 | Closed | ABCR | Not reviewed |
| 284 | | | | X | X | 18 | Closed | PEB Reader/ Writer, DAM, IVIM | Not reviewed |
| 297 | | | | X | | 19 | Closed | | |
| 317 | | | | | X | 20 | Closed | | |
| 318 | | | | X | X | 21 | Closed | IVIM, M100 | Not reviewed |
| 339 | | | | | X | 22 | Closed | | |
| 348 | | X | | X | | 23 | Closed | ABCR, IVIM, DAM, M100 | Not reviewed |
| 355 | | | | | X | 24 | Closed | ABCR, Voyager hand scanner, 4.0 Test Plan | Not reviewed |

| Sys Test # | DS 200 | M 650 | VAT | EMS | Oth-er | iBeta # | Disposition | Portion Excluded from Unity 3.2.0.0 | Out of Scope: Remains Open in Unity v.4.0.0.0 |
|------------|--------|-------|-----|-----|--------|---------|-------------|--|---|
| 359 | | | | | X | 25 | Closed | ABCR , Voyager hand scanner, Test Plan | Not reviewed |
| 361 | | | | | X | 26 | Closed | Test Plan | Not reviewed |
| 372 | X | X | | X | | 27 | Closed | M100 | Not reviewed |
| 411 | | X | | | | 28 | Open FCA | | |
| 429 | | | | X | | 30 | Open | | |
| 435 | | | | | X | 31 | Open FCA | | |
| 453 | X | | | | | 32 | Open FCA | | |
| 454 | X | | | | | 33 | Open FCA | | |
| 473 | | | | X | | 34 | Closed | | |
| 475 | | | | X | | 35 | Open FCA | | |
| 479 | | | | | X | 36 | Closed | | |
| 480 | | | | | X | 37 | Closed | | |
| 492 | | | | X | | 38 | Closed | | |
| 493 | | | | | X | 39 | Closed | | |
| 495 | | | | X | | 40 | Closed | | |
| 496 | | X | | | | 41 | Closed | | |
| 497 | | | | | X | 42 | Closed | | |
| 549 | | | | | X | 43 | Closed | | |
| 550 | | | | | X | 44 | Closed | | |
| 553 | | | | X | | 45 | Open | | |
| 554 | | | | X | | 46 | Open | | |
| 555 | | | | X | | 47 | Open | | |
| 556 | | | | X | | 48 | Open | | |
| 557 | | | | X | | 49 | Closed | | |

Table 6 Out of Scope & Non Issues

| SysTest # | Finding | Disposition |
|--|--|---|
| 190, 191, 196, 198, 235, 238, 245, 369, 382, 388, 390, 401, 428, 434, 437, 441, 442, 445, 446, 450, 451, 452, 458, 461, 463, 464, 466, 467, 468, 469, 474, 478, 483, 485, 486, 487, 488, 490, 491, 494, 498, 503, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 545, 547, 548, 551, 552 | The following are excluded from Unity 3.2.0.0 : System Hardware Automated Bar Code Reader iVotronic DRE Precinct Tabulator Model 100 Precinct Ballot Counter Voyager Hand Scanner (COTS) System Software Unity Data Acquisition Manager Unity iVotronic Ballot Image Manager Uncertified System Features Network Data Transmission Including remote transmission of vote data and/or consolidated results data | Not reviewed, remains open in Unity v.4.0.0.0 |
| 459, 510, 538 | Closed or Informational Issues Comments in the report identified these issues as closed or informational typographic errors | Not reviewed, non-significant issue |
| 499, 500, 501, 502, 504, 505, 506, 507, 508, 509, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 539, 540, 541, 542, 543, 544, 546 | Issues Written Against System Change Notes Changes occurring during the Unity v.4.0.0.0 testing were reported in the System Change Notes. The role of the VSTL in the FCA process is to determine if the changes were tested appropriately and determine how they should be incorporated into functional testing. These discrepancies identify test or other documentation as lacking. The VSS instructs the VSTL to test if testing is inadequate. In iBeta's opinion, as written, these are not documentation discrepancies, but findings applicable to the FCA. | As these are findings for functional test scope they remain open in Unity v.4.0.0.0 ; iBeta shall examine the change notes as part of the FCA Document Review for relevance to the Unity 3.2.0.0 test scope |

2.1.2.3 Recommendation on Reuse of the SysTest Labs PCA Document Review

Based upon the audit and review documented herein iBeta deems that the results of the SysTest PCA Document Review are adequate for reuse in the Unity 3.2.0.0 Certification test effort. Use of the TDP in development of the Volume, Stress, Error Recovery and Security testing shall incorporate additional

review. Any documentation issues encountered shall be reported in the Unity 3.2.0.0 discrepancy report. We do not recommend a more comprehensive review of the TDP. In2-3-2009 Approval Reuse of Testing Final the EAC approved the reuse of the SysTest Labs PCA Document Review.

2.1.3 PCA Source Code Review

The audit of the 3% review of the ES&S Unity 3.2.0.0 source code in accordance the EAC instructions (see section 1 Introduction) for assessment and recommendation for reuse of the applicable Unity v.4.0.0.0 PCA Source Code Review conducted by SysTest.

2.1.3.1 Documentation of the 3% Source Code Review Process

The 3% source code review was conducted using iBeta's PCA Source Code Review Procedure. The source code was delivered from SysTest Labs and configuration managed in the iBeta Source Code Repository. iBeta had previously reviewed source code written in VB, C, C++, SQL and Z80 Assembler for other certification test efforts. These language specific interpretations of the generic VSS 2002 requirements were used. For the COBOL review, iBeta provided the interpretation of each VSS 2002 requirement to ES&S prior to initiating the source code review task. EAC Technical Review staff have been provided access to these interpretations in conjunction with the delivery of this test plan. The VSS 2002 requirements applicable to the source code review included: volume 1 sections 4.2.2 through 4.2.7, 6.2 and 6.4.2; and volume 2 sections 2.4.5.d and 5.4.2.

To select the 3% for review iBeta used a library of static analysis tools to parse each application source code base and obtain a list of the files and functions in addition to the Lines of Code (LOC) count. iBeta used executable LOCs only, excluding comment, blank, or continued lines in the metrics. As our library of static analysis tools did not address COBOL, an alternative method of selection was used. For these two applications, the number of files and files sizes were used to determine the 3% of code to review. Spreadsheets were populated for each application. The selection of files/functions was based upon the file header information documenting the file purpose. iBeta focused the review by selecting source code files and functions that process vote data, audit logs, and reporting.

Another manufacturer (Premier Election Solutions) has submitted a certification effort using the ES&S AutoMARK. The ES&S AutoMARK source code submitted was compared against previously reviewed source code submitted with the Premier certification effort because the code is similar. The differences between the two source code bases were reviewed as part of the ES&S 3% source code review. Unique as well as the shared application discrepancies were reported.

Experienced reviewers who had reviewed source code to the VSS 2002 requirements on a minimum of two VSTL test efforts conducted the peer review of each Source Code Review. In their instructions the EAC stipulated "*This review will focus on important functional sections of the code in order to determine the depth and focus of source review conducted by SysTest*". Following a review of the software design documentation to understand the ES&S coding conventions, architecture and design a peer review analyzed each instance of non-compliance with the VSS 2002 requirements and assessed if the issue impacted source code logic. Discrepancies flagged green dealt with comments, headers, formatting, and style. iBeta identified these as non-logic issues. Potential logic issues, flagged as yellow, needed an EAC decision. There were no confirmed logic issues, which otherwise would have been flagged red. These were submitted to the EAC as individual discrepancy spreadsheets provided as separate confidential compressed files delivered on CD.

Table 7 Matrix of ES&S Unity 3.2.0.0 Source Code Reviewed

| Product | Language | Submitted Version | Review Spreadsheet | Review- ed Lines | Total Lines | Total Issues | EAC Issues |
|---|----------|-------------------|-----------------------------------|---------------------|----------------|-----------------|---------------|
| Unity 3.2.0.0 Software | | | | | | | |
| AutoMARK Information System (AIMS) | Various | 1.3.57 | Shared application | 887 | 265 39 | 9 | 2 |
| | SQL | | SQL AIMS 1.3.54 08062007 | | | 2 | 2 |
| | CS | | Too few lines to review | 0 | 38 | 0 | 0 |
| | C++ | | CPP AIMSCrypt 1.0.0.1 10152008 | 16 | 400 | 2 | 0 |
| | | | | | | | |

| Product | Language | Submitted Version | Review Spreadsheet | Review- ed Lines | Total Lines | Total Issues | EAC Issues |
|----------------------------|-----------|-------------------|--|------------------|-------------|--------------|------------|
| Audit Manager | VB | 7.5.0.0g | VB AuditManager 7.5.0.0g 07312007 | 138 | 3556 | 0 | 0 |
| EDM | C++ | 7.8.0.0j | CPP EDM 7.8.0.0j 073107 | 2539 | 72879 | 6 | 1 |
| ESSXML.DLL | C++ | 2.1.0.0b | CPP EDM ESSXML 2.1.0.0b MFC Shared 1.1.0.0a 06042007 | 111 | 2870 | 1 | 0 |
| MFC Shared Source | C++ | 1.1.0.0a | CPP EDM ESSXML 2.1.0.0b MFC Shared 1.1.0.0a 06042007 | | | | |
| ESSIM | C++ | 7.7.0.0f | CPP ESSIM 7.7.0.0f 07182007 | 1196 | 30546 | 26 | 1 |
| HPM | Cobol | 5.7.0.0f | Cobol HPM 5.7.0.0f 05182008 | | | 178 | 0 |
| HPMDLL | C++ | 1.0.0.0a | CPP HPM-ERM DLLs 1.0.0.0a 06112007 | 0 | 108 | 0 | 0 |
| ERM | Cobol | 7.5.2.0c | Cobol ERM 7.5.2.0c | | | 53 | 4 |
| ERMDLL | C++ | 1.0.0.0a | CPP HPM-ERM DLLs 1.0.0.0a 06112007 | 0 | 0 | 0 | 0 |
| Shared Utilities | | | | | | | |
| MAKEIBIN.EXE | C++ | 9.2.0.0t | CPP Shared Utilities 9.2.2.0 05142008 | 642 | 20804 | 7 | 2 |
| UNDRVOTE.EXE | C++ | 9.2.1.0b | CPP Shared Utilities 9.2.2.0 05142008 | | | | |
| VIOWIN.EXE | C/C++ | 9.2.0.0b | CPP Shared Utilities vol3 05072007 | 28 | 554 | 3 | 0 |
| VIODIALOG.EXE | C/C++ | 9.2.1.0c | CPP Shared Utilities 9.2.2.0 05142008 | | | | |
| EVENTS.EXE | C/C++ | 9.2.0.0h | | | | | |
| IMAGES.EXE | C/C++ | 9.2.0.0f | | | | | |
| CF_Utility.EXE | VB | 9.2.0.0i | VB CF_Utility 9.2.0.0 05072007 | 261 | 8004 | 0 | 0 |
| GetAuditData.EXE | VB | 9.2.0.0b | VB GetAuditData 9.2.0.0b 05072007 | 46 | 1264 | 1 | 0 |
| ESSPEB.DLL | C++ | 1.0.1.0c | CPP Shared Utilities vol2 1.0.1.0 05142008 | 478 | 24872 | 16 | 7 |
| CB_PEB.DLL | C++ | 1.0.1.0b | CPP Shared Utilities vol2 1.0.1.0 05142008 | | | | |
| CRCDLL.DLL | C++ | 1.4.1.0b | CPP Shared Utilities vol3 05072007 | | | | |
| ESSM100.DLL | C/C++ | 1.7.1.0c | CPP Shared Utilities vol2 1.0.1.0 05142008 | | | | |
| ESSPCMIO.DLL | C++ | 1.1.0.0a | | | | | |
| CB_M100.DLL | C++ | 1.4.0.0a | | | | | |
| ESSEAGL.DLL | C++ | 1.3.1.0e | | | | | |
| CB_EAGL.DLL | C++ | 1.3.1.0c | | | | | |
| CB_RAND.DLL | C++ | 1.1.0.0a | | | | | |
| MYDLL.DLL | C | 1.1.0.0a | C ESS all Unity 3.2 04282008 | 538 | 17750 | 12 | 1 |
| MPRBOOT.HEX | Assembler | 2.6.1.0b | ASM MPRBOOT 2.6.1.0b 05162007.xls | 56 | 1340 | 0 | 0 |
| ESSCRYPT.DLL | C/C++ | 1.9.0.0a | CPP Shared Utilities vol2 1.0.1.0 05142008 | | | | |
| ESSDECPY.EXE | C++ | 1.9.0.0a | | | | | |
| ESSCRPT1.DLL | C++ | 1.1.0.0b | | | | | |
| ElectionPackager | C++ | 1.0.0.0e | | | | | |
| ESSZIP | C++ | 2.0.0.0f | | | | | |
| PCCARD30.EXE | C++ | 3.5.0.0h | | | | | |
| PBMtoBMP | C++ | 1.1.0.0c | | | | | |
| WIN650 | C++ | 2.2.1.0.4 | | | | | |
| INIT650.EXE | C/C++ | 2.2.1.0.4 | | | | | |
| SERVE650.EXE (Newserve650) | C++ | 2.2.1.0.4 | | | | | |

| Product | Language | Submitted Version | Review Spreadsheet | Review- ed Lines | Total Lines | Total Issues | EAC Issues |
|--------------------------------------|----------|-------------------|---|------------------|-------------|--------------|------------|
| CB_650.DLL | C | 1.2.0.0a | C ESS all Unity 3.2 04282008 | | | | |
| REGUTIL.DLL | C++ | 1.1.0.0d | CPP Shared Utilities vol2 1.0.1.0 05142008 | | | | |
| SHELLSETUP.EXE | C++ | 1.1.0.0a | | | | | |
| SHELL.EXE | C++ | 1.1.0.0b | CPP Shared Utilities vol3 05072007 | | | | |
| EXITWIN.EXE | VB | 1.1.0.0a | VB ExitWin 1.1.0.0a 04122007 | 33 | 469 | 0 | 0 |
| Firmware | | | | | | | |
| **Model 200** | | | | | | | |
| TOS /wo JVM | | N/A | | | | | |
| DS200 | C/C++ | 1.3.7.0g | CPP DS200 1.3.7.0g 04282008 | 386 | 125 52 | 2 | 1 |
| Power Management_MSP430 | C | 1.2.0.0a | C DS200 all 1.2.0.0a 04282008 | 741 | 209 30 | 3 | 0 |
| Scanner_C8051 | C | 2.11.0.0a | C DS200 all 1.2.0.0a 04282008 | | | | |
| | | | | | | | |
| **Model 650** | | | | | | | |
| M-650 | C | 2.2.1.0.5 | C ESS all Unity 3.2 04282008 | | | | |
| | | | | | | | |
| **AutoMARK** | | | | | | | |
| AutoMARK-Voter Assist Terminal (VAT) | Various | 1.3.2816 | CPP VAT (ESS ScannerPrinterLibrary 1.8.31-GetMarks 1.4.9) 10152008 | 679 | 210 26 | 9 | 2 |
| | | | | | | | |
| Totals | | | | 8775 | 266 501 | 330 | 23 |
| Percentages | | | | % | 3.3 | % | 7 |

2.1.3.2 Summary of 3% Source Code Review Results

A total of 330 discrepancies were identified. The majority, 307 or 93%, were categorized as non-logic issues. The summary of the 23 discrepancies categorized as EAC Decision Discrepancies and ES&S responses are listed in the table.

For 21 discrepancies ES&S provided justification for non-compliance or their disagreement with the iBeta interpretation of the VSS 2002 requirements. Precedence for the iBeta interpretation has been established with testing for other clients and these established interpretations must be applied consistently to all manufacturers under test with iBeta. iBeta acknowledges that in some instances other interpretations may be possible and the EAC Reviewers may deem these alternative interpretations acceptable.

Table 8 Potential Logic Issues

| Language | Component | Disc # | Description | VSS Ref. | iBeta Classification | ES&S Response |
|----------|---|--------|--|--------------|--|--|
| C | WIN650: folder 07-0531 Shared Utilities\WIN650 2.2.1.0.4\Source | 10 | line 329 hard-coded key. | v1: 6.4.2 | Hard-coded key | The hard coded table cited is used in an old scheme to "scramble" or obfuscate the M650 audit log file before it is written to the M650 internal file on the M650 internal RAM drive. The audit log file is printed in real-time on a continuous form matrix printer and becomes the audit log of record. This table and its contents are well commented so it passes the test for hard constants. This function is not used in any way to validate or protect the firmware. |
| COBOL | HPM | 23 | Series of ELSE IF clauses is missing the final ELSE clause | v.1: 4.2.4.a | iBeta interpretation for the control constructs requirement is violated. | V.1: 4.2.4.a specifies the acceptable control constructs to be used. One of the listed acceptable control constructs is If-Then-Else. This section does not |

| Language | Component | Disc # | Description | VSS Ref. | iBeta Classification | ES&S Response |
|----------|-----------|--------|--|---|--|--|
| | | | | | | elaborate any further on the acceptable different forms of syntax for If-Then-Else statements. It is our belief that the sections of code cited in this discrepancy are structured, sound, easily understood and accepted syntax forms of IF-Then-Else statements. |
| COBOL | HPM | 24 | Procedure header contains ONLY description no other required info for procedure over 10 lines of code Series of ELSE IF clauses is missing the final ELSE clause Lines 399,402 & 405 contain non-enumerated constants | v.1: 4.2.3.b 4.2.7 (a, a.1-a.6) 4.2.4.a v.2: 5.4.2.u | 1. iBeta interpretation for the Exit Point requirement is violated. 2. iBeta interpretation for the control constructs requirement is violated. 3. Non-enum constants are acceptable per discrepancy 20 explanation. | V.1: 4.2.4.a specifies the acceptable control constructs to be used. One of the listed acceptable control constructs is If-Then-Else. This section does not elaborate any further on the acceptable different forms of syntax for If-Then-Else statements. It is our belief that the sections of code cited in this discrepancy are structured, sound, easily understood and accepted syntax forms of IF-Then-Else statements. |
| COBOL | HPM | 25 | Procedure header contains ONLY description no other required info for procedure over 10 lines of code Series of ELSE IF clauses is missing the final ELSE clause Lines 415, 417, 422, 425, 428, 431, 436, 439, 442, 445,449, 452, 455 & 458 contain non-enumerated constants | v.1: 4.2.3.b 4.2.7 (a, a.1-a.6) 4.2.4.a v.2: 5.4.2.u | 1. iBeta interpretation for the control constructs requirement is violated. 2. Non-enum constants are acceptable per discrepancy 20 explanation. | V.1: 4.2.4.a specifies the acceptable control constructs to be used. One of the listed acceptable control constructs is If-Then-Else. This section does not elaborate any further on the acceptable different forms of syntax for If-Then-Else statements. It is our belief that the sections of code cited in this discrepancy are structured, sound, easily understood and accepted syntax forms of IF-Then-Else statements. |
| COBOL | HPM | 26 | Procedure header contains ONLY description no other required info for procedure over 10 lines of code Series of ELSE IF clauses is missing the final ELSE clause Lines 467, 470 and 473 contain non-enumerated constants | v.1: 4.2.3.b 4.2.7 (a, a.1-a.6) 4.2.4.a v.2: 5.4.2.u | 1. iBeta interpretation for the control constructs requirement is violated. 2. Non-enum constants are acceptable per discrepancy 20 explanation. | V.1: 4.2.4.a specifies the acceptable control constructs to be used. One of the listed acceptable control constructs is If-Then-Else. This section does not elaborate any further on the acceptable different forms of syntax for If-Then-Else statements. It is our belief that the sections of code cited in this discrepancy are structured, sound, easily understood and accepted syntax forms of IF-Then-Else statements. |
| CPP | EDM | 5 | 1) multiple embedded calls in logical statement at lines 856, 871 2) Illegal breaks at lines 847, 859, 874, line 880 changes the state of the system and therefore break statements are not allowed. If code deletes one it must delete all in order to complete unit operation described. | v.1: 4.2.3.e v.2: 5.4.2.m | Multiple exits | This noted discrepancy is an IF statement that tests the result of several Boolean returning functions. ES&S does not consider these to be embedded statements; the functions aren't doing processing in the sense that they change the state of the system or change any value. Rather they are functions that fetch or otherwise determine a value and return the value. This may be something difficult for a reviewer to discern so they would just flag it because it is a function within a conditional expression. As for the second part of item #5 ES&S would disagree with the reviewer. No state changes (precinct deleted) are made until after the conditions that can trigger those breaks are passed. It is not necessary that all precincts be deleted from the list in this code. |

Two potential logic discrepancies are related to the AutoMARK and are under investigation by both Premier Election Solutions and ES&S. These shall be addressed in a subsequent letter provided to the EAC.

2.1.3.3 Recommendation Regarding the Reuse of the SysTest Source Code Review

In order to provide a recommendation, iBeta evaluated the results of the 3% source code review. Whereas the results would be recommended for acceptance if only non-significant discrepancies were found (i.e. less critical requirement or interpretations inconsistent with documented industry accepted practices), there were discrepancies written that potentially impact the source code. Thus iBeta initiated two additional analyses:

1. iBeta confirmed that the results of the 3% source code review were consistent with the previous results (not identical but consistent). This confirmation was reached by reviewing the types of discrepancies generated by SysTest in the 100% review against those generated by iBeta.
2. iBeta reviewed the severity of the discrepancies identified and assessed that the number of discrepancies potentially impacting the source code is considered very low versus the overall number of discrepancies consistent with a 100% review. The severity of the discrepancies and the manufacturer responses further indicate that the majority of the 21 potential logic discrepancies would be resolved without source code modifications.

Based on the limited or perhaps non-impact on the source code as a result of these discrepancies, iBeta recommended reuse of the results of the SysTest source code review. In *2-3-2009 Approval Reuse of Testing Final* the EAC approved the reuse of the source code review conducted by SysTest Labs.

2.1.4 Reused Environmental Hardware Assessment

In *2-3-2009 Letter to ESS Reuse of Testing Final* the EAC has authorized the reuse of the hardware testing conducted by SysTest Labs' sub-contractors. In order to ensure that these test results provided sufficient documentation of the Environmental Hardware test assessment and results iBeta reviewed the reports to confirm any failures resulting in engineering changes were documented and the reports document that all hardware submitted under Unity 3.2.0.0 passed.

The result of the review generated requests for additional documentation. These requests were documented in issues 1, 2, 3, 6, 7, 8, and 9 of iBeta's *Unity 3.2.0.0 Discrepancy Report*. Responses to all issues were accepted. It should be noted that issues 6 and 7 are accepted by iBeta but are deferred to the EAC for determination of sufficient documentation for test result reuse. These issues are traced to the Test Report and Tested Configuration Matrixes in Appendix B.

Table 9 Environmental Hardware Test Report Review

| No. | Location | Issue Description | Standard- Requirement | ES&S Response | Resolution Validation |
|-----|---|--|---|--|--|
| 1 | Unity 4.0 Discrepancy Report 10/28/08 (SysTest) DS200 with Optional Ballot Box ESD Test Report 1.0 (Percept) | <p>Potentially reusable Unity 4.0 hardware test results do not document validation of the ES&S' resolution of an ESD failure</p> <p>On page 2 of the ESD report a failure and mitigation is identified, however the failure and validation resolution is not documented in the Discrepancy Report or the sub-contractor report. There is no documentation that an ES&S associated engineering change was issued to address the "Modifications Required: The poll close button failed at +15kV in stand alone mode. Copper tape on backside of switch cover was applied to pass at +15kV. The previous VSTL did not provide detail that evidences their validation that an engineering change was initiated by ES&S as a result of the mitigation performed by the subcontractor lab in ESD testing.</p> | <p>v.1: 9.6.2.6.e The ITA shall evaluate data resulting from examinations and tests employing the following practices: Any and all failures that occurred as a result of a deficiency shall be classified as purged, and test results shall be evaluated ...if the 1) manufacturer submits a design, manufacturing ... change notice... 2) examiner of the equipment agrees that the proposed change will correct the deficiency; and 3) manufacturer certifies that the change will be incorporated...</p> <p>EAC NOC 07-005 it is the lead VSTL's responsibility to properly test the voting system and accurately report those tests to the EAC.</p> | <p>ES&S referred this issue to SysTest; SysTest responded 1/8/09: The failure and validation resolution is documented on page 4 and 19 of the sub-contractor report. ES&S submitted ECO 693 to address the "Modifications Required" and Systest' hardware subcontractor Percept completed the Engineering Change Evaluation & Review form. Systest will provide both documents to iBeta.</p> | <p>Accepted, 1/13/08 KS Verified doc Optional Ballot Box ESD, v. 1.0, 4/25/07; pg. 4 shows the failure, and resolution retested and passing. Pg. 19 is a photo showing the part with the copper tape. ECO693 reflected the identified changes.</p> |
| 2 | Unity 4.0 Discrepancy Report 10/28/08 (SysTest) Percept Hardware Test Report 1.0 (DS200 5/1/07) | <p>Potentially reusable Unity 4.0 hardware test results contain no description of two test failures and the validation of their resolution by the VSTL.</p> <p>On page 29 of the sub-contractor (Percept) report two failures (CAR-001_DS200-Radiated Emissions, CAR-002_DS200 - Radiated Immunity) and mitigation with 4 ECOs 690 to 693 are identified. Neither the subcontractor report nor the Discrepancy Report provide a description of how, what, when and where the failures occurred or who, how, when and where the mitigations were performed that resulted in the ECO. There is no identification of the validation of the resolution.</p> <p>1/14/09 KS - Accepted: Verified that "DS200 EMC Test Report 070314-1134A.pdf" Section 6.5 Appx. A, pg. 80 describes 4 modifications made to the DS200 & these modifications match CAR-001 & CAR-002 - Rejected: The ECOs 690 to 693 were not provided. (Note: ECO693 was provided for #1. It does not match the description in the submitted CARs.)</p> | <p>v.1: 9.6.2.6 The ITA shall evaluate data resulting from examinations and tests employing the following practices: a: If any malfunction ... is detected that would be classified as a relevant failure using the criteria in Vol.2, its occurrence ... shall be recorded for inclusion in the analysis of data obtained from the test... e: Any and all failures that occurred as a result of a deficiency shall be classified as purged, and test results shall be evaluated ...if the 2) examiner of the equipment agrees that the proposed change will correct the deficiency EAC NOC 07-005 it is the lead VSTL's responsibility to properly test the voting system and accurately report those tests to the EAC.</p> | <p>ES&S referred this issue to SysTest; SysTest responded 1/8/09: EMC test report "DS200 EMC Test Report 070314-1134A.pdf" Appendix A page 80 of 84 issued by Criterion and Percept CAR-001_DS200-Radiated Emissions, and CAR-002_DS200-Radiated Immunity provide a description of modifications. Systest will provide these documents to iBeta.</p> | <p>Reject 1/14/09 KS ECOs are not provided</p> <p>Accepted 2/6/09 CEC ECO 692 and COTS power supply specification were provided documenting the mitigation changes.</p> |
| 3 | ES&S Retest Matrix v.1.16 - | Potentially reusable Unity 4.0 hardware test results do not contain an assessment of the | v.1: 9.6.1.1 As described in 9.5.2, the nature and scope of testing for system changes or | ES&S referred this issue to SysTest; SysTest responded | Accept 1/14/09 KS Verified that ES&S ECO's |

| No. | Location | Issue Description | Standard- Requirement | ES&S Response | Resolution Validation |
|-----|--|--|---|--|---|
| | <p>DS200 testing (SysTest)</p> <p>DS200 EMC Report R071107-30-01 (NCEE original)</p> <p>DS200 EMC Report R071107-30-01B (NCEE amended)</p> <p>DS200 EMS Test Report 070214-134A 5/15/07 (Criterion)</p> <p>Percept Hardware Test Report 1.0 (DS200 5/1/07)</p> | <p>scope of testing.</p> <p>The HW test matrix lists three EMC reports from two labs for the DS200. Testing performed at Criterion in March 2007 included a ballot box. Testing a few months later at NCEE excluded the ballot box, Power Disturb-ance and Lightening Surge. An original and amended report was issued by NCEE. The HW test matrix indicates that the ESD & FCC Part 15B applicable test results are in the amended NCEE report. Four additional tests run by NCEE are traced to the original NCEE report. All reports identify the DS200 as passing. No report or test plan provides an assessment addressing the NCEE testing or why:</p> <ol style="list-style-type: none"> 1) The EMC testing needed to be repeated by NCEE for six tests when the Percept and Criterion report indicate the system passed. 2) Power Disturbance and Lightening Surge weren't repeated. 3) Only ESD and FCC Part 15B results use the amended NCEE report when updates were made to all tests. 4) The NCEE testing excluded the ballot box. | <p>new versions shall be determined by the ITA based upon the nature and scope of the modifications to the system and on the quality of system documentation and configuration management records submitted by the manufacturer.</p> | <p>1/8/09: ES&S changed components on PMB, USB, PEB, ASB, and PSB to be RoHS compliant as detailed in ECOs 702-706. These changes have no impact on the power supply, therefore Power Disturbance, and Lightening Surge tests weren't repeated. Note both original and amended NCEE reports are identical except the amended report now references the correct FEC document (see sec. 1.3 Reason for Amendments pg 3 of 43 for details in the amended report). Also the changes have no impact on ballot box, therefore the NCEE testing excluded the ballot box. Systest will provide these documents to iBeta.</p> | <p>702-706 addressing the changes to DS200 for Restriction of Hazardous Substances (Lead) were provide. In addition the corresponding SysTest ECO assessment and the comments submitted with these documents address the SysTest rationale for testing.</p> |
| 4 | <p>Unity 4.0 Test Plan rev. 9.1 Attachments</p> | <p>The appendices identified in the rev.9.1 of the Test Plan were not provided in the package from SysTest.</p> <p>The EAC has instructed that testing of Unity 3.2 shall incorporate system limitation testing per the approved Unity 4.0 Test Plan. The appendices referenced in the Section 1.1 were not provided with the Test Plan.</p> | <p>v.1: 8.7.2.b.1 The FCA s conducted by the ITA to verify that the system performs all the functions described in the system documentation. The manufacturer shall: provide the following information to support his audit: copies of all procedures used for ... integration testing and system testing</p> | | <p>Accept 1/14/09 KS The EAC provided a chain of evidence copy - Unity 4.0 T.P.v.6 Attachments A -H</p> |
| 5 | <p>Unity 4.0 Test Plan rev. 9.1 spreadsheet of system limitations</p> | <p>A spreadsheet containing information regarding the testing of system limitations for the approved EAC Unity 4.0 Test Plan was not provided.</p> <p>The EAC has instructed that testing of Unity 3.2 shall incorporate system limitation testing per the approved Unity 4.0 Test Plan. "The attached spreadsheet" that provides a matrix of limitation is identified in section 4.3.10.2 but was not provided with the Test Plan.</p> | <p>v.1: 8.7.2.b.3 The FCA s conducted by the ITA to verify that the system performs all the functions described in the system documentation. The manufacturer shall: provide the following information to support his audit: records of all tests performed ... including error corrections and retests</p> | <p>ES&S referred this issue to SysTest; SysTest responded 1/8/09: Systest will provide a spread-sheet containing information regarding the testing of system limitations to iBeta.</p> | <p>Accepted: 1/14/09 KS Verified the limitations spreadsheet was received</p> |
| 6 | <p>ES&S Retest</p> | <p>The Temperature, Power Variation and</p> | <p>v.2: B.5 The test report shall be organized</p> | <p>ES&S referred this issue to</p> | <p>Accepted: 1/15/09 KS -</p> |

| No. | Location | Issue Description | Standard- Requirement | ES&S Response | Resolution Validation |
|-----|---|---|--|---|--|
| | Matrix v.1.16 - DS200 testing (SysTest) APT Labs Testing Services Report M650 Job no.08-00654 (5/2/08) | Reliability report does not identify whether the M650 passed or failed. The matrix indicates the APT report contains the results of M650 Testing for Temperature, Power Variations and Reliability. Section 5.1 indicates that the operational tests are performed by SysTest and they will determine the pass/fail of the test. No SysTest report identifying the pass/fail report has been provided. | so as to facilitate the presentation of conclusions ...a summary of test results ... | SysTest; SysTest responded 1/8/09: The APT policy is not to state the results of testing in their test report as they do not perform operational status check. Systest performed the operational status check prior to and after each test so they left it up to Systest to state whether a product passed or failed. Systest stated that the product passed in their Environmental Test Case Summary. A copy of Environmental Test Case Summary will be provided to iBeta. | Verified the SysTest Test Summary Report references SUN APT lab as performing environmental testing and "All tested equipment successfully passed each of the environmental tests to which the equipment was subjected." Defer to EAC for determination of reuse. |
| 7 | AutoMARK Voter Assist Terminal Test Report rev.1.3 (Percept 5/19/05) | Potentially reusable Unity 4.0 hardware test results (A100) contain no description of the engineering changes initiated during testing. Section 2.1 of the sub-contractor report identifies S/N-008 returned for a calibration error; it does not identify if it was associated with the test failure identified in section 3.4.1 & 3.4.1.1.1. The VAT failure identifies mechanical changes but does not identify the engineering change. As neither the original ITA report nor supporting documentation of the failure was submitted it could not be validated if the discrepancy and resolution was documented in the test record. | v.1: 9.6.2.6 The ITA shall evaluate data resulting from examinations and tests employing the following practices: a: If any malfunction ... is detected that would be classified as a relevant failure using the criteria in Vol.2, its occurrence ... shall be recorded for inclusion in the analysis of data obtained from the test... e: Any and all failures that occurred as a result of a deficiency shall be classified as purged, and test results shall be evaluated ...if the 2) examiner of the equipment agrees that the proposed change will correct the deficiency EAC NOC 07-005 it is the lead VSTL's responsibility to properly test the voting system and accurately report those tests to the EAC. | ES&S referred this issue to SysTest; SysTest responded 1/8/09: Per Humidity Test Nonconforming Work and Corrective Action Request S/N-008 returned for a calibration error was not associated with the test failure identified in section 3.4.1 & 3.4.1.1.1 S/N:-008 was associated with 120 hrs humidity test Sec. 3.3.5 of the test report. Automark submitted ECO 0025 to address mechanical change. Systest will provide these documents to iBeta. | Accepted: 1/14/09 KS Verified that ECN-025 matches the failure identified in sections 3.4.1 & 3.4.1.1.1. CAR SN-008 identifies "humidity test was restarted after installing a new touch screen panel with adequate clearance for the wires". The CAR identifies how the system was restored but does not clearly identify the reason for the failure. It is unclear if "clearance for the wires" was an Engineering Change or replacement of a failed part. iBeta accepts the response but refers these findings to the EAC for determination of reuse. |
| 8 | ES&S AutoMARK VAT A200 (Report No. 080521-1215R 6/11/08) | Potentially reusable Unity 4.0 hardware test results for the AutoMARK VAT A100 do not contain an assessment of the changes in the VAT models that permit the use of A100 and A200 reports. An EMC report for the A200 was submitted with the A100 reports. Reuse of prior hardware environmental testing is permitted by the EAC if an ESD test is performed. A 2008 ESD for the A200 was submitted to support reuse of the 2005 A100 testing. There is no assessment of the hardware that identifies the impact on testing of the | v.1: 9.5.2.1 The ITA will determine the test necessary for to qualify the modified system based on a review of the nature and scope of changes... EAC Voting System Test and Certification Program Manual v.1.0 2.10.5.2 Use of valid prior testing is authorized only when: 2.10.5.2.1. The discrete software or hardware component previously tested is demonstrably identical to that presently offered for testing. VSTLs must examine the components to ensure no change has taken | ES&S referred this issue to SysTest; SysTest responded 1/8/09: Phase 2 Change Summary. pdf document describes the differences between the model A100 and A200. 5K50-30 vs 5K50-20 Differential items_G.pdf document describes the differences between the model A200 and A300. Please note there are no hardware differences between the model A200 and A300. AutoMARK | Reject: 1/15/09 KS Phase 2 Change Summary.pdf references ECO324 - 346 which were not provided. 1/15/09 KS Accept: Verified that Phase 2 Change Summary.pdf and submitted SysTest ECO 200-206, 208, 210-247, 256-278 assessments identify changes between A100 & A200. Confirmed that all required testing identified in these |

| No. | Location | Issue Description | Standard- Requirement | ES&S Response | Resolution Validation |
|-----|---|---|--|---|--|
| | | <p>changes between the A100 and A200 so that the A200 ESD testing is sufficient to support reuse of the A100 2005 reports. The A200 report indicates that Electric Fast Transit was repeated but there is no assessment identifying why this test was required but the other tests were not required.</p> <p>1/15/09 KS Accept: Verified that Phase 2 Change Summary.pdf and submitted SysTest ECO 200-206, 208, 210-247, 256-278 assessments identify changes between A100 & A200. Confirmed that all required testing identified in these assessments was performed in AutoMARK VAT1.1 EMC Test Report 051214-995R.pdf; Document 5K50-30 vs 5K50-20 Differential items_G.pdf reviewed for changes between A200 & A300. Reject: The Phase 2 Change Summary.pdf identifies ECO324-346. SysTest did not provide these assessments</p> | <p>place consistent with all documentation. When valid prior testing is used, the system presented must be subject to regression testing, functional testing and system integration testing;</p> <p>2.10.5.2.2. The voting system standards applicable to the prior and current testing are identical;</p> <p>2.10.5.2.3. The test methods used are substantially identical to current test methods approved by the EAC; and</p> <p>2.10.5.2.4. The adoption and use of valid prior testing is noted in the test plan and test report.</p> | <p>Voter Assist Terminal Test Report rev 1.3.pdf is the test report for model A200. Systest will provide these documents to iBeta.</p> | <p>assessments was performed in AutoMARK VAT1.1 EMC Test Report 051214-995R.pdf; Document 5K50-30 vs 5K50-20 Differential items_G.pdf reviewed for changes between A200 & A300.</p> <p>Accept: 2/6/09 CEC Verified receipt of the ESO324 - 346</p> |
| 9 | VAT A300 EMC report 070730-1165 Criterion | <p>Potentially reusable Unity 4.0 hardware test results for the AutoMARK VAT A200 do not contain an assessment of the changes that permits use of the A300 reports.</p> <p>An EMC report for the A300 was submitted for the A200 report. There is no assessment of scope that identifies the differences between the A200 and A300.</p> | <p>v.1: 9.5.2.1 The ITA will determine the test necessary for to qualify the modified system based on a review of the nature and scope of changes...</p> | <p>ES&S referred this issue to SysTest; SysTest responded 1/8/09: Premier Election Systems is listed as the client in the test report but the model number that was tested is VAT A100 which is common to both companies. Both Al Backlund and Darrick Forester believe that there was discussion of joint testing between ES&S and Premier but Systest was not involved in it.</p> | <p>Accept 1/14/09 KS Accepted based upon the response in discrepancy #8 that there are no differences between the A200 and A300.</p> |

3 Materials Required for Testing

The System Identification stipulates the following materials required for testing of ES&S Unity 3.2.0.0 voting system.

3.1 Voting System Software

The software listed in below is the documented configuration of the ES&S Unity 3.2.0.0 voting system.

Table 10 Voting System Software

| Application | Manufacturer | Version | Description (identify COTS) |
|--|---------------|---|---|
| Audit Manager (AM) | ES&S | 7.5.2.0 | A Unity election management system audit logging software application including security and user tracking for the Election Data Manager and Ballot Image Manager |
| Election Data Manager (EDM) | ES&S | 7.8.0.0 | A Unity election management system software application to define and store jurisdiction election data in a single-entry database |
| Ballot Image Manager (ESSIM) with Ballot On Demand (BOD) | ES&S | 7.7.0.0 | A Unity election management system desktop publishing tool to layout and format paper ballots BOD is an optional operating mode in ESSIM used to print election quality ES&S paper ballots on a COTS OKI 9600 HDN color laser printer. |
| AutoMARK Information Management System (AIMS) | ES&S AutoMARK | 1.3.57 | A windows-based election management system software application to define election parameters for the VAT, including functionality to import election definition files produced by the Unity EMS and create VAT flash memory cards |
| Hardware Programming Manager (HPM) | ES&S | 5.7.0.0 | A Unity election management system software application to import, format, and convert an election file and create election definitions for ballot scanning equipment |
| Election Reporting Manager (ERM) | ES&S | 7.5.2.0 | A Unity central count software application to compile and report election results |
| Voter Assist Terminal (VAT) | ES&S AutoMARK | 1.3.2904 | A software application to assist multilingual voters and voters with visual, aural or dexterity disabilities to vote a paper ballots in a private manner |
| intElect DS200 | ES&S | 1.3.7.0, Power Management FW v. 1.2.0.0, Scanner FW v. 2.11.0.0 | A Unity Voting System precinct count optical scanner paper ballot tabulator including a 12-inch touch screen display providing voter feedback and poll worker messaging. |
| Model 650 (M650) | ES&S | 2.2.1.0 | A Unity Voting System central count high-speed optical scanner paper ballot tabulator. The M650 prints results reports to an external printer and saves results to a zip disk. |
| Microsoft Windows XP Professional | Microsoft | Service Pack 2 | COTS personal computer operating system |
| Excel (Microsoft Office) | Microsoft | | COTS software used by AIMS to import audio scripts |
| Acrobat Standard | Adobe | v.8 & v.9 | COTs software used with ESSIM to create ballot files for printing, testing was completed with both versions |
| Adobe Types Basic | Adobe | | COTs software used with ESSIM to create ballot files for printing |
| RM/COBOL | | v.11.01 | COTs interpreter software used in HPM & ERM |

3.2 Voting System Hardware & Equipment

The equipment listed below is the documented configuration of the ES&S Unity 3.2.0.0 voting system

Table 11 Voting System Hardware & other Equipment

| Hardware or Equipment | Manufacturer | Version | Description (identify COTS) |
|--|--------------|---|---|
| M650 | | | |
| M650 Tabulators SN: 7003- red, left oval SN: 1102 7011- green, left oval | ES&S | HW 1.2 FW 2.2.1.0 | Central count optical scanners, each scanners has color specific optical light and reads either a left or right ballot oval. iBeta verified no network card was installed |
| M650 Tabulator SN: 2406 8013- green, right oval | ES&S | HW 1.1 FW 2.2.1.0 | Central count optical scanners, each scanners has color specific optical light and reads either a left or right ballot oval, . iBeta verified no network card was installed |
| Microline 520 9pin Printers Configured w/ SN:7003: <ul style="list-style-type: none"> SN: 204A2005641 SN: 407D4011099 Configured w/ SN:1102 7011 <ul style="list-style-type: none"> SN: 407D4010960 SN: 407D4010894 | Okidata | Model: GE5258A | M650 Results Report & Audit Log Printers (COTS) |
| LQ-590 Printers Configured w/ SN: 2406 8013 SN: FSQY094255 SN: FSQY093447 | Epson | Model: #P363A | M650 Results Report & Audit Log Printers (COTS) |
| Universal Power Supply SN: 20V06516228WE SN: 20V06516249WE SN: 20V06516248WE | Belkin | N/A | M650 UPS (COTS) |
| DS200 | | | |
| intElect DS200 SN: ES0107360007 SN: ES0107370002 (Received modem equipped, modem must be removed prior to test execution) | ES&S | HW 1.2.0 FW 1.3.7.0 Power Mgmt FW v. 1.2.0.0, Scanner FW v.2.11.0.0 | Precinct count optical scanner, iBeta observed removal of the modem cards. |
| intElect DS200 SN: ES0107370025 (Received modem equipped, modem must be removed prior to test execution) | ES&S | HW 1.2.1 FW 1.3.7.0 Power Mgmt FW v. 1.2.0.0, Scanner FW v.2.11.0.0 | Precinct count optical scanner, iBeta observed removal of the modem cards. v.1.2.1 change: Mylar spacing tabs to eliminate paper jams and a changed battery pack resistor value R109 from 1 M ohms to 100 k ohms |
| DS200 Plastic Ballot Box P/N 94098 | ES&S | N/A | Precinct Plastic Ballot Box, No Diverter |
| Steel Ballot Box P/N 76246, SN: C4243 | ES&S | N/A | Precinct Steel Ballot Box, with Diverter |
| Steel Ballot Box P/N 76245-10, SN: 1573 | ES&S | N/A | Precinct Steel Ballot Box, No Diverter |
| AutoMARK VAT | | | |
| AutoMARK Voter Assist Terminal SN: AM0106430376 | ES&S | Model A100, HW Rev 1.0 FW 1.3.2904 OS 5.00.14 PEB v.1.65 SBC v. 1.0 | Accessible paper ballot marking device original release - multiple cable connector and printed circuit boards are mounted in the lower portion of the VAT |
| AutoMARK Voter Assist Terminal SN: AM0206443384 | ES&S | Model A200 HW Rev 1.1 FW 1.3.2904 OS 5.00.14 PEB v.1.65 SBC v. 2.0 | Accessible paper ballot marking device Change: Consolidate PCB, relocate PCB and cables to upper portion for easier maintenance |
| AutoMARK Voter Assist Terminal SN: AM0208470767 | ES&S | Model A200 HW Rev 1.3.1 FW 1.3.2904 OS 5.00.19 PEB v.1.65 SBC v. 2.5 | Accessible paper ballot marking device Change: LCD replacement, ROHS board components, change CPU and Flash Chips on the SBC board FW, Win CE OS Bootloader for P30 flash, OS update to support DST and Hash check (Note: Hash check is not supported in this version of the VAT FW) |
| AutoMARK Voter Assist Terminal SN: AM02008470815 | ES&S | Model A200 HW Rev 1.3.1 | Accessible paper ballot marking device Change: PEB FW to support Enhanced |

| Hardware or Equipment | Manufacturer | Version | Description (identify COTS) |
|--|--------------|---|--|
| | | FW 1.3.2904 OS 5.00.19 PEB v.1.70 SBC v. 2.5 | AutoCast and Double Spit & Wipe (Note: Enhanced Auto Cast is not supported in this version of the VAT FW.) |
| AutoMARK Voter Assist Terminal SN: AM0206462702 | ES&S | Model A200 HW Rev 1.3.0 FW 1.4.2970 OS 5.00.17 PEB v.1.70 SBC v. 2.0 | iBeta inspected this HW test unit to confirm inclusion of ECO's 761 (LCD), 759 (ROHS) |
| Ballot-on-Demand | | | |
| COTS - HDN color laser printer | | | Note: All testing of this product was completed by SysTest Labs; iBeta did not receive this hardware |

3.3 Testing Software, Hardware & Materials

The software, hardware and materials listed below are needed to support testing and in test simulations of elections of the ES&S Unity 3.2.0.0 voting system.

Table 12 Testing Software, Hardware & Materials

| Software, Hardware or Material | Description | Description of use in testing |
|--|--|--|
| Ballot Marker Pens | Marking Device | Supplied by ES&S: VL Ballot Pen to mark paper ballots |
| Beyond Compare 2 v.2.4.3 (Scooter Software) | Comparison utility | Supplied by iBeta: used to compare file/folder differences |
| Hash.exe v.7.08.10.07.12 (Maresware) | Hash creation utility | Supplied by iBeta: used to generate hash signatures for Trusted Builds |
| Thumb Drive 512MB & 8GB | Storage media for the DS200 | Media for installing elections |
| Iomega Zip Disk 100MB | Storage Media | COTS: Media with election definition and results totals for M650 |
| SanDisk CompactFlash Card 256MB | Storage media for the VAT | Media for installing elections, recording and reporting votes |
| Paper Ballots | Paper Ballots - 11", 14", 17" & 19", 3 and 4 ovals per inch | Supplied by ES&S: Miscellaneous ballots for VAT, DS200, M650 with preprinted election content, and blank ballot stock for VAT audit log |
| Paper | Paper - Continuous feed | COTS: for Central count (M650) audit log and reports |
| Paper (8 1/2 x 11) | Paper, Inkjet Printer | COTS: for reports from AM, EDM, ESSIM, HPM, ERM reports |
| Paper rolls | Paper, Thermal Printer | COTS: DS200 reports |
| Repository servers | Separate servers for storage of test documents and source code, running industry standards operating systems, security and back up utilities | Supplied by iBeta: Documents are maintained on a secure network server. Source code is maintained on a separate data disk on a restricted server |
| Multiple desktop and laptop PCs | A variety of PCs running Microsoft operating systems | Supplied by iBeta: Preparation, management and recording of test plans, test cases, reviews and results |
| Repository servers | Separate servers for storage of test documents and source code, running industry standards operating systems, security and back up utilities | Supplied by iBeta: Documents are maintained on a secure network server. Source code is maintained on a separate data disk on a restricted server |
| Microsoft Office 2003 | Excel and Word software and document templates | Supplied by iBeta: The software used to create and record test plans, test cases, reviews and results |
| SharePoint 2003 | TDP and test documentation repository | Supplied by iBeta: TDP and test documentation repository and configuration management tool |
| Other standard business application software | Internet browsers, PDF viewers email | Supplied by iBeta: Industry standard tools to support testing, business and project implementation |
| Visual Studio 2003 v.7.1.3808 (Microsoft) | Build and source code review Integrated Development Environment | Supplied by iBeta: View source code review |
| RSM v.6.92 (M Squared Technologies) | C, C++, Java & C# static analysis tool | Supplied by iBeta: identify line counts and cyclomatic complexity |
| Beyond Compare 2 v.2.4.3 (Scooter Software) | Comparison utility | Supplied by iBeta: used to compare file/folder differences |
| WinDiff 5.1 (Microsoft) | Comparison utility | Supplied by iBeta: used to compare file/folder differences |
| Hash.exe v.7.08.10.07.12 (Maresware) | Hash creation utility | Supplied by iBeta: used to generate hash signatures for Trusted Builds |
| Symantec Ghost v.11 & (14) v.2.5 | Image capture tool | Supplied by iBeta: used to capture build and |

| Software, Hardware or Material | Description | Description of use in testing |
|--------------------------------|-------------------------------------|--|
| Automation Anywhere | Functional automated scripting tool | test environments Supplied by iBeta: automate a script to write to write to Audit Manager |

3.4 Deliverable Materials

The materials listed in below are to be delivered as part of the ES&S Unity 3.2.0.0 voting system.

Table 13 Delivered Voting System Materials

| Material | Material Description | Use in the Voting System |
|--|--|---|
| Audit Manager (AM) | A Unity election management system audit logging software application including security and user tracking for the Election Data Manager and Ballot Image Manager | EMS audit log software for election definition and ballot preparation applications |
| Election Data Manager (EDM) | A Unity election management system software application to define and store jurisdiction and election data | EMS software for election definition and ballot preparation of the M650 and DS200 |
| Ballot Image Manager (ESSIM) with Ballot On Demand (BOD) | A Unity election management system desktop publishing tool to layout and format paper ballots BOD is an optional operating mode in ESSIM to print election quality ES&S paper ballots on a COTS OKI 9600 HDN color laser printer. | EMS software for paper ballot preparation |
| AutoMARK Information Management System (AIMS) | A windows-based election management system software application to define election parameters for the VAT and create VAT flash memory cards. AIMS includes functionality to import election definition files from Unity EMS. | EMS software to program the election definition for the VAT |
| Hardware Programming Manager (HPM) | A Unity election management system software application to import, format, and convert an election file and create election definitions for ballot scanning equipment | EMS software to program the election definition on the optical scanners |
| Election Reporting Manager (ERM) | A Unity central count election management system software application to consolidate, tally and report election results | EMS software for importation and consolidation of election results from the M650 and DS200 |
| AutoMARK Voter Assist Terminal (VAT) | An accessible paper ballot marking device for the Unity voting system | Audio and non-manual input device to record votes on Unity paper ballots |
| intElect DS200 (DS200) | A Unity precinct count optical scanner | Precinct count vote tabulator |
| Model 650 (M650) | A Unity central count optical scanner | Central count vote tabulator, configured for use with left or right ovals and green or red optical read light |
| Microline 520 9pin and LQ-590 Printers | COTS printers used for M650 reporting | Central count vote tabulator report and audit log printers |
| HDN color laser printer | A high quality COTS printer for printing a Ballots on Demand | Print a limited number of ballots at the election office |
| Thumb Drive 512MB, 1, 4, or 8GB | Storage media for the DS200 | Media for installing elections |
| SanDisk CompactFlash Card 256MB | Storage media for the VAT | Media for installing elections, recording and reporting votes |
| Ballot Marker Pen | Paper ballot hand marking device | Device to hand mark votes on paper |
| Iomega Zip Disk 100MB | Storage media for the M650 | Media for installing elections, recording and reporting votes |
| Paper Ballots | Paper ballots | Record votes on paper |

3.5 Proprietary Data

All software, hardware, documentation and materials shall be considered by iBeta as proprietary to ES&S. None of the elements submitted for certification testing may be used outside the scope of testing. No release or disclosure may occur without the written authorization of ES&S. Authorization for iBeta's release of information to the EAC is contained in the MSA contract.

No information submitted to the EAC with this test plan has been identified by ES&S as subject to restriction on use, release or disclosure.

iBeta has provided internal process documentation to the EAC to assist in the review of their test plan. This information includes programming language specific review criteria and test case detail. These documents are tendered in separate electronic files and identified as confidential and protected from release as a trade secret because they are a description of how the process is performed and the end the result of substantial effort. This information is explicitly prohibited from release by the FOIA and the Trade Secrets Act (18 U.S.C. §1905).

4 Test Specifications

Certification testing of the Unity 3.2.0.0 is to the configuration submitted in the EAC application #ESS0701 to the requirements of the VSS 2002. To ensure that Unity 3.2.0.0 conforms to the requirements of the VSS 2002 and *EAC Testing and Certification Program Manual*, in addition to a validation of test coverage, iBeta has traced the test plan to the *ES&S Unity 3.2.0.0 EAC Matrix*. The test methods in Appendix A of this test plan identify how testing to the VSS 2002 will be implemented and the organizations responsible for the testing. This implementation is then documented in a corresponding test case.

Testing for the system level (functional and integration), environmental, accuracy, reliability, availability and characteristics (recovery, usability, accessibility, and maintainability) test cases were performed by SysTest Labs and assessed for reuse by the EAC. The results are identified in Section 1. Appendix A identifies the certification test scope covered by this testing.

Volume, stress, security, telephony and cryptographic test methods were developed by iBeta following a review of the EAC approved *Unity 4.0.0.0 Test Plan*, [the 3% Source Code Review Assessment](#), the system limitations and security documentation for the components of the Unity 3.2.0.0 voting system. The test methods are contained in Appendix A. A test case is developed for each test method. Documentation of all test iterations shall be maintained in the test case with a separate record of the configuration and results of each test execution.

The analysis and assessments performed for source code review, PCA document review, and FCA Document Review is included in section 2.

4.1 Hardware Configuration & Design

The baseline hardware configuration of the ES&S Unity 3.2.0.0 submitted for testing is identified in Table 11 Voting System Hardware & other Equipment. It is recorded in the *PCA Configuration* document. If during testing there is any change to the configuration of the system, the complete voting system configuration will be recorded on a new tab. The new tab will reflect the date upon which the new configuration was documented. All test cases identified in Table 14 iBeta Sampling of System Function & Test Cases and Table 15 System- Level Test Cases will include verification and documentation of the test environment against the applicable PCA Configuration tab.

In a preliminary configuration examination of three units transferred from SysTest Labs the DS200 failed to boot up. This issue was reported (discrepancy #87). The compact flash cards were returned to ES&S for examination. It was determined that a file system error that performed a check was incorrectly set to 6 months. In order to resolve the issue, ES&S provided a script file to change the setting of Max_amount to equal 1 and remove W-TEMP. iBeta reviewed the script and restored the compact flash using the build provided by SysTest Labs and ran the script.

4.2 Software System Functions

Testing of the software system functions defined in the VSS 2002 include:

- Identification of the functional test scope based upon the PCA TDP Document Review (Vol. 2, Sect. 2) and FCA review of the ES&S Unity 3.2.0.0 voting system testing (Vol.2 Appendix A.2)
- PCA TDP Source Code Review of all new or changed code (Vol.2 Sect. 5.4)
- Witness the build of the reviewed code for the baseline version of the system the manufacturer intends to sell and deliver to the jurisdiction. (Vol.2. Sect. 6.2)
- Development of a Certification Test Plan and Test Cases (Vol. 2, Appendix A.)
- Execution of Functional/System Integration Tests including those listed in the Reuse System Level Test Method and the Regression System Level Test Case (Vol. 2, Sect. 6)
- Testing of the performance and sequence of system software functions identified in System Operations, Maintenance and Diagnostic Testing Manuals, including those listed in the Reuse System Level Test Methods, Reuse Accuracy Test Method, Reuse Characteristics Test Method and the Volume, Stress, Security, Telephony and Cryptographic Test Cases. (Vol. 2. Sec. 6.8)

- Verification of COTs software and completion of a trusted build by iBeta with the source code provided by SysTest Labs and any changes to source code resulting from testing. iBeta shall construct the build and record the file signature of the build environment and final build. The process follows. All section 5.7 of the Certification Program Manual specified deliverables shall be provided to the EAC stipulated escrow agency upon certification. iBeta staff shall follow the steps outlined in the iBeta *Trusted Build Procedure* to ensure compliance with the section 5.6 of the Certification Program Manual.

4.3 Test Case Design

4.3.1 Hardware Qualitative Examination Design

iBeta conducted a review of Unity v.4.0.0.0 EAC approved test plan for Volume, Stress, Recovery and Security and the performance characteristics identified in the Unity 3.2.0.0 submitted TDP. The review was conducted in accordance with vol. 2 Appendix A.4.3.1 (a-d) of the VSS 2002 and Section 301 of HAVA. The results of this review were recorded in the FCA Test Document Review and mapped to all applicable iBeta test cases. As a result of this review it was determined that iBeta will conduct Volume, Stress, Security and Error Recovery testing to determine the quality of the hardware design. iBeta will also conduct a System Level Regression Test to determine the quality of the overall voting capabilities, pre-voting, voting and post voting functions of the ES&S Unity 3.2.0.0 voting system. The EAC shall assess in the SysTest Labs test results for the Reuse Characteristic (Usability, Accessibility and Maintenance), Reuse Functional System Level, Reuse Accuracy and Reliability testing identified in the applicable test method.

An examination of the ES&S Unity 3.2.0.0 voting system was conducted to confirm that it does not contain: wireless technology, modems, or use of the public networks. The results of this review were recorded in the FCA Test Document Review and mapped to the applicable iBeta test method. As a result of this review it was determined that the voting system:

- Is exempted from wireless, modem and testing associated with use of the public networks.

SysTest Labs and their subcontractors (see Section 1 Introduction) examined the Unity v.4.0.0.0 and determined the scope of hardware environmental testing required by the VSS 2002. The EAC conducted a review of the SysTest Labs environmental testing for Unity v.4.0.0.0 and approved its reuse. iBeta compiled the test reports applicable to the scope of Unity 3.2.0.0 and confirmed the reports identified the hardware had passed and that any failures identified in the reports had documentation of a matching engineering change. A trace matrix of the test reports and the tested equipment configuration is contained in Appendix B.

4.3.2 Hardware Environmental Test Case Design

The SysTest Labs' subcontractors listed in section 1 performed hardware testing of the Unity v.4.0.0.0 voting system. The review, analysis, testing and test results are contained in the test reports and engineering change assessments listed in the Table 2 External Documents - Unity v.4.0.0.0 Test Documents. The EAC issued their approval for reuse of the results of the SysTest Labs Environmental Hardware testing in 2-3-2009 *Letter to ESS Reuse of Testing Final*. In order to ensure that iBeta had all documentation of the Environmental Hardware test assessment and results for the Unity 3.2.0.0 voting system. iBeta reviewed the reports to confirm they included documentation that the Unity 3.2.0.0 submitted hardware passed the required tests and that any failures resulting in engineering changes were documented. This work was performed as part of the Pre-Certification Test Activities. The results are identified in section 2.1.4

4.3.3 Software Module Test Case Design & Data

ES&S has petitioned for reuse of the functional testing performed by SysTest in the certification effort of Unity v.4.0.0.0. Included in this petition is reuse of the Unity 3.2.0.0 applicable portions of the EAC approved *ES&S Unity 4.0 Certification Test Plan Document Number 07-V-ESS-035-CTP-01* Rev. 10.0. This approved test plan has been attached as Appendix C.

The iBeta customized test cases include the identification of the controls between the applications, user interfaces, and hardware interfaces with the capture of entry and exit data. (See Table 14 iBeta Sampling of System Function & Test Cases, Table 15 System- Level Test Cases, and [the cross referenced test methods](#) in Appendix A.)

4.3.4 Software Functional Test Case Design

ES&S has petitioned for reuse of the functional testing performed by SysTest in the certification effort of Unity v.4.0.0.0. Included in this petition is reuse of the Unity 3.2.0.0 applicable portions of the EAC approved *ES&S Unity 4.0 Certification Test Plan Document Number 07-V-ESS-035-CTP-01* Rev. 10.0. This approved test plan has been attached as Appendix C.

Following the process outlined in Section 2.1.1 Document Review and Results iBeta identified the scope of required functional testing outside the EAC petition for reuse. Testing identified as outside the petition for reuse included Volume, Stress, Error Handling and Security. As appropriate unique functional or integrated system level test cases were defined.

The ES&S Unity 3.2.0.0 voting system functions are identified in the SysTest Labs Test Plan (See Appendix C). A sampling of this functionality will be tested by iBeta, as identified in Table 14 iBeta Sampling of System Function & Test Cases. Greater description of each Test Case is found in the Test Methods. (See Appendix A Table 17) Detailed test steps and test data are found in the separate individual Test Case documents.

Table 14 iBeta Sampling of System Function & Test Cases

| iBeta Sampling of System Function | Test Case |
|--|--|
| a. Ballot Preparation Subsystem | Regression System Level Volume 3 |
| b. Test operations performed prior to , during and after processing of ballots, including: | |
| i. Logic Test – Interpretation of Ballot Styles & recognition of precincts | Regression System Level Volume 1, 2 & 7 |
| ii. Accuracy Tests- Ballot reading accuracy | Regression System Level Volume 1, 2, 6 to 10 |
| iii. Status Tests- Equipment statement & memory contents | Regression System Level Volume 1, 2, 6 to 10 |
| iv. Report Generation – Produce test output data | Regression System Level Volume 1, 2, 6 to 10 |
| v. Report Generation- Produce audit data | Regression System Level Volume 1, 2, 6 to 10 |
| c. Procedures applicable to equipment used in a Polling Place for: | |
| i. Opening the polls, accepting & counting ballots | Regression System Level Volume 1, 2, 6, 7, 9 & 10 |
| ii. Monitoring equipment status | Regression System Level Volume 1, 2, 6, 7, 9 & 10 |
| iii. Equipment response to commands | Regression System Level Volume 1, 2, 6, 7, 9 & 10 |
| iv. Generating real-time audit | Regression System Level Volume 1, 2, 6, 7, 9 & 10 |
| v. Closing polls and disabling ballot acceptance | Regression System Level Volume 1, 2, 6, 7, 9 & 10 |
| vi. Generating election data reports | Regression System Level Volume 1, 2, 6, 7, 9 & 10 |
| vii Transfer ballot count to central counting location | Regression System Level Volume 1, 2, 6, 7, 9 & 10 |
| viii Electronic transmission | Telephony & Cryptographic |
| d. Procedures applicable to equipment used in a Central Count Place | |
| i. Process ballot deck or PMD for >1 | Regression System Level Volume 1 & 6 |
| ii. Monitoring equipment status | Regression System Level Volume 1, 2, 6, 7, 9 & 10 |

| iBeta Sampling of System Function | Test Case |
|---|--|
| iii. Equipment response to commands | Regression System Level Volume 1, 2, 6, 7, 9 & 10 |
| iv. Integration with peripherals equipment or other data processing systems | Regression System Level Volume 1, 2, 6, 7, 9 & 10 |
| v. Generating real-time audit messages | Volume 1, 2, 6, 7, 9 & 10 |
| vi. Generating precinct-level election data reports | Regression System Level Volume 1, 2, 7, 9 & 10 |
| vii. Generating summary election data reports | Regression System Level Volume 1, 2, 6, 7, 9 & 10 |

4.3.5 System Level Test Case Design

System Level Test Cases have been prepared to assess the response of the hardware and software to a range of conditions.

iBeta reviewed the document *System Limitations Election Systems and Software* and compared each identified limit to a corresponding ES&S largest jurisdiction for that limit. It was found that in all instances the ES&S system limit exceeded the largest jurisdiction. While the capacity varied for each limit, iBeta observed the system limit capacity was 115% to 474% of the largest jurisdiction. iBeta identified:

- Volume conditions to determine that the voting system could successfully prepare and process elections to the maximum capacity without errors for the election criteria listed in Table 15 a. Volume Tests.
- Stress conditions to verify that the voting system provides an appropriate response to an overloading condition exceeding the maximum capacity for the election criteria listed in Table 15 b. Stress Tests.
- Error recovery conditions using a three part approach. First, the 3% Source Code Review verified the error response and recovery within the sample of code examined. The results were reported to the EAC for consideration in their determination of reuse of the SysTest Labs Source Code Review (see section 2.1.3 and Table 15 g. Recovery Tests). The second part of the approach was to force hardware errors for power recovery (see Table 15 g. Recovery Tests). The third part was the incorporation of error responses into the Volume and Stress testing such that error recovery would confirm that in exceeding a limit the voting system was able to recovery without losing vote data (see Table 15 g. Recovery Tests)

Security testing also incorporated source code and document reviews as identified by iBeta's security review. The security documentation review was conducted in accordance with vol. 2 Section 6.4 and documented in the *FCA Security Review*. Functionality to meet the requirements of vol. 1 section 6 incorporated secrecy, integrity, system audit, error recovery or access to the voting system. The review was either conducted or peer reviewed by an iBeta CISSP staff member. Based upon this review specific security tests, source code and/or document reviews were defined. The tests or reviews to validate the security of Unity 3.2.0.0 were recorded in the *FCA Security Review* and used to prepare the Security Test Method.

Detailed information for the tests identified in Table 15 is included in the corresponding Test Method contained in Section 7 Appendix A - Test Methods All of these test cases or reviews identify Accept/Reject performance criteria for certification based upon the VSS 2002 and the Unity 3.2.0.0 voting system software, hardware, security and specifications. Detailed test steps and test data are found in the separate individual Test Case documents.

Table 15 System- Level Test Cases

| | Test Method (Method Detail) |
|--|------------------------------|
| a. Volume Test | |
| Using the ES&S defined Unity 3.2.0.0 system limitations and the estimated maximums of the largest ES&S customers, confirm that the system limit exceeds the customer maximums. Document in the test case the percentage that the system limit exceeds the customer maximum. (System Limit * 100) / Customer Maximum = % System Limit) | Volume 1 – 4 & 6-10 (Volume) |
| Using the ES&S defined system limit, verify that the maximum capacity is | |

| | Test Method (Method Detail) |
|--|--|
| <p>successfully prepared and processed without errors for:</p> <p>Vol. 1) The maximum number of precincts and ballot styles within an election.</p> <p>Vol. 2) The maximum number of ballot styles in a precinct</p> <p>Vol. 4) See below (g. Recovery Tests)</p> <p>Vol. 6) The maximum number of precincts in a single polling place</p> <p>Vol. 7) The maximum number of ballot styles in a precinct</p> <p>Vol. 8) The maximum number of candidates/contest in an election on an M650</p> <p>Vol. 9) The maximum number of candidates/counter in an election</p> <p>Vol. 10) The maximum number of ballot styles in an election</p> <p>Verify that during the expected hours of operation audit entries are successfully recorded without errors for:</p> <p>Vol. 3) Audit Manager listings generated during EDM and ESSIM ballot preparation</p> | |
| b. Stress Test | |
| <p>Using the ES&S defined system limits, verify that the voting system provides an appropriate response to an overloading condition, exceeding:</p> <p>Vol. 1) The maximum number of precincts and ballot styles within an election.</p> <p>Vol. 2) The maximum number of ballot styles in a precinct</p> <p>Vol. 4) See below (g. Recovery Tests)</p> <p>Vol. 6) The maximum number of precincts in a single polling place</p> <p>Vol. 7) The maximum number of ballot styles in a precinct</p> <p>Vol. 8) The maximum number of candidates/contest in an election on an M650</p> <p>Vol. 9) The maximum number of candidates/counter in an election</p> <p>Vol. 10) The maximum number of ballot styles in an election</p> <p>Verify that higher than the expected level of operation is successfully processed without errors for:</p> <p>Vol. 3) Audit Manager listings generated during EDM and ESSIM ballot preparation</p> <p>Stress scenarios exceeding the maximum limitations will be executed to confirm any applicable error handling:</p> <p>If error messages are generated they are:</p> <ul style="list-style-type: none"> - Stored & reported as they occur - Errors requiring intervention clearly display issues & action instructions or with indicators - Incorrect responses will not lead to irreversible errors. <p>If error messages are not generated:</p> <ul style="list-style-type: none"> - The system processes without error; or - If there are any system errors then the system shall recover without any loss of data. | Volume 1 – 4 & 6-10 (Stress) |
| c. Usability Tests: | |
| <p>Election database and ballots will be prepared, installed, voted and reported exercising the input controls, error content, and audit message content of the voting system.</p> <ul style="list-style-type: none"> • A review will assess the content and clarity of instructions and processes. | Reuse System Level Reuse Characteristics Volume Tests 1-10 Error Recovery |
| d. Accessibility Tests: | |
| <p>An audio Spanish and English ballot will be programmed. Votes will be marked on the VAT to confirm:</p> <ul style="list-style-type: none"> • Ballots can be accessed visually, aurally or with non-electronic dexterity aids in Spanish and English • Ballots can be accessed with various screen contrast, ballot display settings, and required audio ballot controls • Physical aspect measurements of the voting system will comply with the VSS 2002 | Reuse System Level Reuse Characteristics Regression System Level |
| e. Security Tests: | incomplete |
| <p>During system level testing steps will be incorporated into the pre-vote, vote, and post vote election phases. These steps shall test:</p> <ul style="list-style-type: none"> • Security access controls limit or detect access to critical systems (ballot preparation ballot installation, poll opening/closing, ballot activation, transfer of data, reporting of results and audit functions) • Loss of system integrity, availability, confidentiality and accountability are | Regression System Level Security Review (iBeta) |

| | Test Method (Method Detail) |
|---|--|
| <p>detectable</p> <ul style="list-style-type: none"> The effectiveness of the documented security policies and procedures <p>Security specific test cases shall include:</p> <ul style="list-style-type: none"> Attempts to circumvent user sign in and insert media to circumvent Methods to bypass or defeat the security Denial of service attacks simulated using insert Poll workers, and voters as threat agents to access the ability of the voting system to resist or detect attacks, log and/or report attempts Effectiveness of the documented security policies and procedures <p>(The details for these high level test objectives are found in Table 23 - Security & Telephony Test Methods)</p> <p>Telephony test cases shall include:</p> <ul style="list-style-type: none"> Confirmation that the system doesn't access the public telephone network <p>After defining language specific review criteria, a software source code review will be executed to confirm that:</p> <ul style="list-style-type: none"> Modules contain single exit points There are no unbound arrays There are no vote counter overflows Audit records log errors & events There is separate and redundant ballot image, vote and audit recording Voting systems halt execution at the loss of critical systems There are no computer-generated passwords | <p>Security Review (iBeta)</p> <p>iBeta 3% Source Code Review Assessment and the SysTest Labs' Source Code Review</p> |
| f. Performance Tests: | |
| <p>During various functional and accuracy testing the elections will be programmed, voted and tallied to ensure ballot formats are accurately displayed, votes are accurately and reliably cast for the voting variations and functionality supported by the voting system.</p> <p>High or overloaded volume processing, storing and reporting shall occur without system degradation.</p> | <p>Reuse System Level Regression System Level</p> <p>Volume 1-10 - Performance</p> |
| g. Recovery Tests: | |
| <p>Consistency assessment of Source Code to confirm that the single exit point is the point where control is returned. At that point, the data that is expected as output is appropriately set. The exception for the exit point is where a problem is so severe that execution cannot be resumed. In this case, the design explicitly protects all recorded votes and audit log information and implements formal exception handlers provided by the language.</p> <p>iBeta examined the power recovery test case and results provided by SysTest Labs to determine sufficiency for incorporation of results into the iBeta testing to determine the system is able to:</p> <ul style="list-style-type: none"> Recover from power or other system failure, without loss of vote data; and Be supported on back up power for a minimum of two hours. <p>Vol. 1) The maximum number of precincts and ballot styles within an election. Vol. 2) The maximum number of ballot styles in a precinct Vol. 4) The maximum media, DS200 & M650, capacity Vol. 6) The maximum number of precincts in a single polling place Vol. 7) The maximum number of ballot styles in a precinct Vol. 8) The maximum number of candidates/contest in an election on an M650 Vol. 9) The maximum number of candidates/counter in an election Vol. 10) The maximum number of ballot styles in an election Verify that higher than the expected level of operation is successfully processed without errors for: Vol. 3) Audit Manager listings generated during EDM and ESSIM ballot preparation</p> <p>If during Volume and Stress testing there are system errors that cause a crash the system shall recover without any loss of data</p> | <p>iBeta 3% Source Code Review Assessment Source code review- v.1: 4.2.3.e</p> <p>Volume 5 (Reuse Electrical Supply)</p> <p>Regression System Level Volume 1-4 & 5-10 Error Recovery</p> |

5 Test Data

5.1 Test Data Recording

Test data recording by SysTest Labs and their subcontractors is identified by SysTest Labs and reviewed by the EAC in Unity v.4.0.0.0 test effort determination of reuse for Unity 3.2.0.0. SysTest Lab's environmental subcontractors recorded environmental test data in a manner appropriate to the test equipment with output reports detailing the results and analysis.

The results of testing and review performed by iBeta on the ES&S Unity 3.2.0.0 voting system to the VSS 2002 are recorded in the test case and review forms prepared by iBeta. Electronic copies of all testing and reviews will be maintained.

5.2 Test Data Criteria

Evaluation of the results of the voting system tests and reviews by SysTest Labs and their subcontractors is identified by SysTest Labs and reviewed by the EAC in Unity v.4.0.0.0 test effort determination of reuse for Unity 3.2.0.0.

The results of the voting system tests and review results shall be evaluated against the documentation of the Unity 3.2.0.0 voting system, and the requirements of the VSS 2002. The Unity 3.2.0.0 voting system shall be evaluated for its performance against the standard and the expected results identified in each test case.

5.3 Test Data Reduction

SysTest Labs' test data reduction is reviewed by the EAC in the Unity v.4.0.0.0 test effort determination of reuse for Unity 3.2.0.0.

iBeta will process the test data manually.

6 Test Procedures & Conditions

6.1 Facility Requirements

The test location of the Functional, System Level, Accessibility, Usability and Environmental testing is identified in the SysTest Labs Unity v.4.0.0.0 Test Plan. All software testing and review performed by iBeta will be performed at iBeta's laboratory in Aurora, Colorado.

ES&S Unity v.4.0.0.0 test documentation will be maintained by SysTest Labs, as directed by the EAC. The ES&S Unity 3.2.0.0 documentation, test documentation and results will be maintained in the ES&S Unity 3.2.0.0 voting system project folder on the SharePoint server in the Voting business vertical repository. Only project assigned test personnel will have access to the ES&S repository. ES&S source code will be maintained on a separate server. Only project assigned test personnel will have access to the source code repository. Repositories are backed up daily using industry standard utilities.

6.2 Test Set-up

Documentation of the ES&S Unity v.4.0.0.0 test set-up performed by SysTest Labs is to be reviewed by the EAC for determination of reuse. This testing incorporated the printing of a Ballot-on-Demand feature using the specified COTS printer.

As part of the PCA iBeta will set-up, the ES&S Unity 3.2.0.0 voting system test platform in the manner identified in the system configuration identified in the Unity 3.2.0.0 system overview, excluding the Ballot-on-Demand COTS printer. The test platform will be documented. Installation of the witnessed build will be observed and documented. An inventory of any accessories or preloaded applications will be documented.

6.3 Test Sequence

There is no prescribed sequence for the testing of the voting system. The only sequence requirement is that predecessor tasks are completed prior to initiation of a task.

Table 16 –Sequence of Certification Test Tasks

| Certification Test Task | Predecessor Task | iBeta Test Personnel |
|--|---|---|
| Identify scope of project for contract negotiation | Determination of voting system status (new or changed); EAC preliminary direction regarding determination of scope | Carolyn Coggins and Gail Audette |
| Set up Project and Repositories | Contract Authority | Carolyn Coggins and Gail Audette |
| Reporting of Discrepancies | Commencement of the project | All test staff |
| Review PCA TDP Documents for Assessment of Reuse | Project repository and Unity 3.2.0.0 TDP documents received | All test staff |
| Issue PCA TDP Document Review Assessment to the EAC | Sampling examination of Unity 3.2.0.0 TDP documents | Carolyn Coggins |
| Review PCA Source Code Review 3% Assessment | Project repository and Unity 3.2.0.0 TDP Documents & Unity v.4.0.0.0 Source Code received from SysTest | Kevin Wilson, Sridevi Jakileti, Lauren Laboe, & Gail Audette |
| Issue PCA Source Code Review 3% Assessment to the EAC | Sampling identification and examination of 3% of previously reviewed source code | Gail Audette |
| FCA Testing Review and Test Scope/ requirements identification | Unity 3.2.0.0 TDP documents received; Unity v.4.0.0.0 test artifacts from SysTest; EAC preliminary direction regarding determination of reuse | Kelly Swift, Carolyn Coggins, Jenn Garcia, & Kevin Wilson |
| Certification Test Plan | PCA TDP Document and PCA Source Code Review 3 % Assessments, FCA Testing Review | All test staff |
| FCA Test Case preparation | EAC preliminary direction regarding determination of reuse; FCA Testing Review, Identification of Test Scope and Requirements | Jenn Garcia, Kelly Swift, Kevin Wilson, Sridevi Jakileti, Stephanie Eaton & Carolyn Coggins |
| PCA System Configuration | v. 3.2.0.0 TDP, hardware and software received and checked-in | Stephanie Eaton, Jenn Garcia, Kelly Swift & Carolyn Coggins |

| Certification Test Task | Predecessor Task | iBeta Test Personnel |
|---|---|---|
| PCA Witness Build | EAC determination of reuse; Unity v.4.0.0.0 Trusted Builds received from SysTest | Kevin Wilson & Sridevi Jakileti |
| Test Method validation | Completion of test method | Carolyn Coggins, Jenn Garcia & Stephanie Eaton |
| Test tool validation | Identification of tools; verify validations performed on earlier projects for standard tools | Kevin Wilson, Gail Audette, Lich Le, Jenn Garcia, & Stephanie Eaton |
| Installation of Witnessed Build | Review and validation of installation procedure including user selections and configuration changes | Kevin Wilson & Sridevi Jakileti |
| Unity 3.2.0.0 FCA Environmental Hardware Test Report identification and examination | EAC letter with determination of reuse; Unity v.4.0.0.0 test artifacts from SysTest | Carolyn Coggins & Kelly Swift |
| FCA Accuracy Test Case Reuse | Test method identification in the Unity 3.2.0.0 test plan; EAC determination of reuse | Carolyn Coggins |
| FCA Functional/System Level Test Case Reuse | Test method identification in the Unity 3.2.0.0 test plan; EAC determination of reuse | Kelly Swift & Carolyn Coggins |
| FCA Functional/System Level Regression Test Case Execution | Unity 3.2.0.0 test plan completion & EAC approval; test case completion; and Trusted Build completion | Stephanie Eaton, Jenn Garcia, Kelly Swift & TBD |
| FCA Characteristic Test Case Reuse | Test method identification in the Unity 3.2.0.0 test plan; EAC determination of reuse | Carolyn Coggins |
| FCA Security Review & Testing | Unity 3.2.0.0 test plan completion & EAC approval; test case completion; and Witnessed Build completion | Kevin Wilson & Sridevi Jakileti |
| FCA Telephony and Cryptography Review and Test Case | Unity 3.2.0.0 test plan completion & EAC approval; test case completion; and Witnessed Build completion | Kevin Wilson & Sridevi Jakileti |
| Validation of COTs for Trusted Build | Receipt of COTS SW and Unity 4.0.0.0 COTS validations from SysTest | Kevin Wilson & Sridevi Jakileti |
| Trusted Build | Receipt of all build software and hardware, clean build platform, and validation of COTS complete | Kevin Wilson & Sridevi Jakileti |
| Regression Testing of Discrepancy Fixes | Receipt of applicable fix or response from ES&S and PCA Witness Build of reviewed code, if applicable | TBD if applicable |
| Document receipt of the System Identification Tools from the manufacturer | Receipt of the System Identification Tools from the manufacturer | TBD |
| VSTL Certification Report | EAC documentation of the determination of reuse; successfully complete all FCA and PCA tasks; | All test staff |
| Deliver the Certification Report for EAC Review | Completion of VSTL Certification Report | Carolyn Coggins |
| Deposit Trusted Build and acknowledge delivery | Initial decision from the EAC and manufacturer letter | Carolyn Coggins |
| Re-issue the Certification Report with the EAC Certification Number | Acceptance of the Certification Report by the EAC | Carolyn Coggins |
| Archive all testing | Issuance of EAC certification number | Stephanie Eaton & TBD |

6.4 Test Operations Procedures

SysTest Labs Test Operations Procedures are subject to review by the EAC.

iBeta test cases and review criteria are contained in separate documents. They are provided to the iBeta test staff and Environmental Hardware Subcontractor with step-by-step procedures for each test case or review conducted. Test and review instructions identify the methods for test or review controls. Results are recorded for each test or review step. Possible results include:

- **Accept:** the expected result of the test case is observed; an element of the voting system meets the VSS 2002.
- **Reject:** the expected result of the test case is not observed; an element of the voting system did not meet the VSS 2002.
- **Not Applicable (NA):** test or review steps that are not applicable to the scope of the current Certification are marked NA.
- **Not Testable (NT):** rejection of a previous test step prevents execution of this and subsequent test steps.

Reject, Not Applicable and Not Testable results are marked with an explanatory note. The note for rejected results contains the discrepancy number.

Issues identified in testing or reviews are logged on the Discrepancy Report. Issue types include:

- **Document Defects:** a documentation element of the voting system did not meet the VSS 2002. Resolution of the defect is required for certification.

- Functional Defects: a hardware or software element of the voting system did not meet the VSS 2002. Resolution of the defect is required for certification.
- Informational: an element of the voting system which meets the VSS 2002 but may be significant to either the manufacturer or the jurisdiction. Resolution of Informational issues is optional. Unresolved issues are disclosed in the certification report.

Test steps are numbered and a tabulation of the test results is reported in the test case. Test operation personnel and their assignments are identified in the table above.

7 Appendix A - Test Methods

7.1 System Level Test Methods (Reuse & Regression)

Table 17 - System Level Test Methods (Reuse & Regression)

| Method Detail | Reuse System Level Test Method | Regression System Level Test Method |
|---|--|---|
| Test Case Name | Reuse System Level : SysTest Labs Unity v.4.0.0.0 Test Cases applicable to the scope of Unity 3.2.0.0: Readiness, Functional, Maintainability, GEN01, GEN02, GEN02 PA, GEN03, PRI01, PRI01 PP, PRI02, 40HTEST1, Ohio Test, 40HTEST3, 40HTEST4, 40HTEST5, 3000 Precincts, Error Recovery, and Electrical Supply | Regression System Level Test Case |
| Scope - identifies the type of test | ES&S has petitioned the EAC for reuse of the applicable components in scope for Unity 3.2.0.0 from the SysTest Labs testing of the Unity v.4.0.0.0 certification test effort. Determination of reuse of test results for functional, system level, usability, and accessibility testing performed by SysTest Labs validating the VSS 2002 required and ES&S identified functionality for the Unity 3.2.0.0 voting system is identified in Appendix D . | <p>A regression system level test incorporating validations of a substantial portion of the VSS 2002 required and vendor identified functionality for the Unity 3.2.0.0 voting system.</p> <p>Pre-vote: Create a Pick-a-Party Primary election; prepare election media and paper ballots in EDM, ESSIM and HPM; import into AIMS .</p> <p>Vote: Vote Election Day hand & machine marked paper ballots (VAT:A100 & A200); precinct scanning (DS200)</p> <p>Post Vote: Write election results (DS200); scan absentee hand marked and VAT marked ballots (M650 central scanner); consolidate absentee & Election Day votes into ERM for tallying and reporting.</p> <p>Testing includes validation of measurable performance including accuracy, processing rate, and ballot format handling capability, incorporating: testing</p> <ul style="list-style-type: none"> - ENH14322 (zero totals in ERM- RFI-2008-07) - Discrepancy #35 (SysTest 475 ERM Number-Key District report BUG13966.) - Discrepancy 30 (SysTest 429 Election description, Vote for phrase when only 1, Vote for phrase) - Discrepancy #48 (SysTest 556 AM archive functionality) <p>Functional aspects include error recovery, security, and usability of the hardware, software procedures in the pre-vote, voting, and post-voting operations with voter accessibility and multilingual ballots included.</p> |
| Test Objective | Determination by the EAC of the reuse of SysTest Labs testing, test results and test reporting for Ballot-on-Demand (BOD), VAT and tabulators (DS200, M650), for Unity 3.2.0.0 from the SysTest Labs testing of the Unity v.4.0.0.0 certification test effort. | <p>Validation of the ability to:</p> <ul style="list-style-type: none"> - Accurately and securely create paper English and Spanish visual and audio ballots for a pick-a-party primary election; - Create and install election specific media for the VAT and DS200 and M650; - Independently and securely vote audio and visual ballots with mobility and non-mobility restrictions; - Count and report the results; and <p>Validate identified enhancements and discrepancies.</p> |
| Test Variables: Voting Variations (as supported by the voting system) | See Appendix D | <p>In Scope for Unity 3.2.0.0:</p> <p>Open Pick-a-Party Primary comprising:</p> <ul style="list-style-type: none"> - An 11 inch combined paper ballot containing Dem, Rep & Non-Partisan selections, with ovals on the right side - 1 Polling Place - 2 Ballot Styles comprising: - 3 Precincts (1000, 2000, 3000) splits (3000-01, 3000-02) - 2 Partisan, 1 Non-Partisan, 1 Referendum Contests & a Party Selection <p>Election Day voting (VAT & DS200)</p> <p>Absentee Voting (M650)</p> <p>Write-in votes</p> |

| Method Detail | Reuse System Level Test Method | Regression System Level Test Method |
|---|--|--|
| | | <p>Vote for N of M</p> <p>Overvotes</p> <p>Undervotes</p> <p>Blank Ballots</p> <p>Assistive Devices (AT paddles, tactilely discernible keypad, Audio\Visual ballots)</p> <p>Multi-lingual Audio & Visual Ballots (English & Spanish)</p> <p>- Two audio preparation methods: conversion of election text file from Unity to synthesized speech in AIMS (Eloquence COTS SW) & WAV audio files recorded in AIMS</p> <p>- DS200 Ballot Control Options (HPM): Query: Overvotes & Crossover ballots; Reject: Blank ballots & unreadable marks; Accept: undervote.</p> <p>- AIMS Overvote and Undervote alerts selected for VAT. (Overvotes prevented)</p> <p>- DS200 is set to not permit reopening of the polls. (TC will be repeated with system set to permit reopening of the polls)</p> |
| A description of the voting system type and the operational environment | <p>The EAC to determine the reuse of SysTest Labs testing of the operational environment as applicable to Unity 3.2.0.0:</p> <p>EMS Ballot Preparation SW: Audit Manager (AM), Election Data Manager (EDM), ES&S Image Manager (ESSIM), Hardware Programming Manager (HPM), AutoMARK Information Management System (AIMS)</p> <p>Ballot Marking Device: Voter Assist Terminal (VAT), Models A100 & A200</p> <p>Precinct Count scanner/tabulator: intElect DS200 (DS200)</p> <p>Central Count scanner/tabulator: Model 650 (M650)</p> <p>Central Count Tally : Election Reporting Manager (ERM)</p> | <p>The Unity 3.2.0.0 voting system includes:</p> <p>EMS Ballot Preparation SW: Audit Manager (AM), Election Data Manager (EDM), ES&S Image Manager (ESSIM), Hardware Programming Manager (HPM), AutoMARK Information Management System (AIMS)</p> <p>Ballot Marking Device: Voter Assist Terminal (VAT), Models A100 & A200</p> <p>Precinct Count scanner/tabulator: intElect DS200 (DS200)</p> <p>Central Count scanner/tabulator: Model 650 (M650)</p> <p>Central Count Tally system: Election Reporting Manager (ERM)</p> |
| VSS 2002 vol. 1 | <p>2.2.1 thru 2.2.9, 2.2.11 thru 2.5.3.2, 2.5.4, 3.2.4 thru 3.2.4.2.1, 3.2.4.2.3, 3.2.4.2.5, 3.2.4.2.6, 3.2.5 thru 3.2.6.1.2, 3.2.7 thru 3.2.8.2</p> <p>HAVA a thru c2</p> <p>RFI: 2007-02, 2007-04, 2007-06, 2008-04, 2008-07, 2008-12</p> | <p>2.2.1 thru 2.2.9, 2.3.1.1 thru 2.5.3.2 , (DRE requirements applicable to VAT excluding vote storage) 3.2.4.2.5, 3.2.4.2.6, 3.2.5.1.3 a thru d.4, 3.2.6.1.1, 3.2.8 thru 3.2.8.2</p> <p>HAVA a thru c2</p> <p>RFI: 2007-02, 2007-04, 2007-06, 2008-04, 2008-07, 2008-12</p> |
| VSS 2002 vol. 2 | <p>6.2, 6.2.1, 6.2.2, 6.3, 6.4, 6.4.1, 6.5, 6.6, 6.7</p> <p>RFI: 2007-06, 2008-07, 2008-12</p> | <p>6.2, 6.2.1, 6.2.2, 6.3, 6.4, 6.4.1 , 6.5, 6.6, 6.7</p> <p>RFI: 2007-06, 2008-07, 2008-12</p> |
| Hardware, Software voting system configuration and test location | <p>Determination by the EAC of the reuse of SysTest Labs testing. Configuration of SysTest Labs See Appendix D</p> | <p>EMS Software:</p> <p>AM v. 7.5.0.0</p> <p>EDM v. 7.8.0.0</p> <p>ESSIM v. 7.7.0.0</p> <p>AIMS v. 1.3.57</p> <p>HPM v. 5.7.0.0</p> <p>ERM v. 7.5.2.0</p> <p>Hardware/Firmware specific to this test case:</p> <p>VAT Model s including A100 & A200's</p> <p>Precinct count: DS200: HW: 1.2.0; FW: 1.3.7.0, SN: ES0107360007</p> <p>Central count: M650: Green (Right) HW Rev. 1.1, FW: 2.2.1.0 SN: 2406 8013</p> <p>Checklists: Election Day Training Manual Unity v 4.0, August 2007 Readiness</p> <p>Checklists: AM , EDM, ESSIM, HPM</p> <p>ERM Pre-Election Day Training Manual v.7.5.0.0 May 9, 2008 checklist</p> <p>DS200 Pre-Election Day Checklist v.1.3.7.0, July 2, 2008</p> <p>M650: Pre-Election Day Checklist Version Number 2.2.1.0, February 29, 2008</p> <p>Test Location: iBeta, 3131 S. Vaughn Way, Aurora, CO 80014</p> |

| Method Detail | Reuse System Level Test Method | Regression System Level Test Method |
|--|--------------------------------|--|
| Pre-requisites and preparation for execution of the test case. | See Appendix D | <p>Prior to execution of testing, the following prerequisites must be completed:</p> <ul style="list-style-type: none"> - Record the testers & date - Perform and install witness/trusted build of software/firmware components utilizing ES&S documentation - System has been installed and set up as identified in the user manuals - Gather any necessary materials or manuals (A microphone, PC soundcard and speakers are available/installed to record audio, white and blue blank ballot stock paper) - Ensure customization of the test case template is complete |
| Getting Started Checks | See Appendix D | <p>Check the voting system to:</p> <ul style="list-style-type: none"> - Verify the test environment and system configuration is documented in the PCA Configuration matches the configuration of the system used in the 48 hr. temp & power variation test and vendor described configuration. - Validate installation of the witnessed build - Testers understand that no change shall occur to the test environment without documentation in the test record and the authorization of the project manager. - During testing an operational readiness test will be performed. |
| Documentation of Test Data & Test Results | See Appendix D | <p>Test Data:</p> <ul style="list-style-type: none"> - Record all programmed & observed election, ballot & vote data fields and field contents on the corresponding tabs to provide a method to repeat the test - Preserve all tabs for each instance the test is run. <p>Test Results:</p> <ul style="list-style-type: none"> - Enter Accept/Reject on the Test Steps - In Comments enter any deviations, discrepancies, or notable observations - Log discrepancies on the Discrepancy Report and insert the number in the Comments |
| Pre-vote: Ballot Preparation procedures verifications | See Appendix D | <p><u>Ballot Prep:</u> Verify</p> <ul style="list-style-type: none"> - Spanish/English, visual/audio ballots (contests, candidates , propositions and associated offices/labels) can be accurately/securely defined with multiple ballot styles, precincts and splits. - Ballots contain partisan races segregated by party and non-partisan races (Dem, Rep, Non-Partisan) - Ballots contain identifying marks (ballot style, precincts/splits) - Volume test elections and ballot styles are retained and can be accessed - Ballot & VAT: ovals properly align with candidate names/issues so voters can clearly mark selections; spacing and font size is consistent so there is no preferential voting position - VAT: maximum choices for a single contest are displayed on one page - The election can be accurately/securely imported from Unity 3.2.0.0 into AIMS. (Prerequisite: define and print ballot in Unity 3.2.0.0, before importing into AIMS.) - The AIMS database can be modified, as required, to support the election definition required for VAT operation; and using AIMS Preview function confirm data was imported correctly and ballots are set up correctly. - Election media can be accurately/securely programmed in HPM and AIMS for installation in all voting & tabulating devices. (VAT, DS200, M650) - AM, EDM, ESSIM, HPM, ERM, VAT, M650 & DS200 Application & hardware readiness checklists are accurate and successfully completed <p>Validate Discrepancy 30 (Election description, Vote for phrase when only 1, Vote for phrase)</p> <p>Installation of Election</p> <p>VAT: Setup & install election; perform maintenance checks: 1. ink cartridge. 2. battery charge 3. Install Flash Memory Card. 4. Test VAT operations (Jurisdiction Guide Ch. 5) 5. Set Admin password 6. Calibrate 7. Set 'Maint' password (Jurisdiction Guide Ch. 6)</p> |

| Method Detail | Reuse System Level Test Method | Regression System Level Test Method |
|--|--------------------------------|--|
| | | <p>to confirm there are no hardware/software failures</p> <p>DS200: Setup & install election; perform readiness checklist</p> <p>M650: Setup & install election; set Date & Time; and perform readiness checklist</p> |
| Pre-vote: Ballot Preparation Security | See Appendix D | <p><u>Ballot Prep:</u></p> <ul style="list-style-type: none"> -Security access controls limit or detect access to critical systems and the loss of system integrity, availability, confidentiality & accountability, including AM: A userid/password control access to EDM & ESSIM; confirm access is permitted and denied without proper credentials HPM: An administrator password; access the DS200 Admin menu on the DS200 Scanner Options screen; and a password to reopen polls ERM: An administrator password; prevent access to "Suspension Menu"; and confirm access is denied. DS200: A password is required to access Admin menu; a separate password is required to reopen polls M650: Back door is locked AIMS: NT password controls access to AIMS computer, password required to start AIMS VAT: Admin password controls the functions on the System Maint menu (password set on each VAT) <ul style="list-style-type: none"> -Functions are only executable in the intended manner, order & under intended conditions -Prevents execution of functions if preconditions weren't met -Implemented restrictions on controlled functions - Documentation of mandatory administrative procedures. <p>COTS</p> <ul style="list-style-type: none"> -Authentication is configured on the local terminal & external connection devices, -Operating systems are enabled for all session & connection openings, & closings, all process executions & terminations & for the alteration or detection of any memory or file object -Configure the system to only execute intended & needed processes during the execution election software. Processes are halted until termination of critical system processes (such as audit). |
| Readiness Testing and Poll Verification | See Appendix D | <p><u>Readiness Testing: Verification that:</u></p> <p>VAT: Proper election has been installed: all buttons, printers and screen function correctly; matching version is displayed; and a ballot can be marked in test mode .</p> <ul style="list-style-type: none"> - Review audit logs to confirm readiness for VAT <p>DS200: Readiness testing automatically incorporated into Opening the Polls; Election name, equipment identification, polling place & ballot format and matching version is displayed or printed on initial state report and/or zero count report; confirmation that there are no hardware/software failures; and device is ready to be activated to accept votes. Perform "DS200 Election Day Checklist Version Number 1.3.7.0, May 9, 2008</p> <ul style="list-style-type: none"> - Obtain status, data reports, audit logs and other artifacts to confirm readiness for DS200 - Attempt to open polls with test totals. Verify a visual screen warning is provided if memory locations (including data on media) contains votes, and the reports/audit log contain a time-stamp record of the status of the votes/results memory and disk storage locations. If a unit or system contains a non-zero counter, a warning message is provided, along with corrective actions to resolve the votes. The unit is disabled until type of resolution is selected. |

| Method Detail | Reuse System Level Test Method | Regression System Level Test Method |
|--|--------------------------------|---|
| Pre- vote: Opening the Polls Verification | See Appendix D | <p>- Verify test data has been cleared</p> <p>Precinct Count: <u>Internal testing:</u></p> <ul style="list-style-type: none"> - DS200 select 'Open Polls'. Zero report will automatically print, an internal test will be performed and results will display. If test is unsuccessful, DS200 will automatically shut down; If successful will display "Please Insert Your Ballot" message - Insert election FMC. VAT will boot up when key switch is turned to 'On' flashing displays of the boot procedure will appear on the screen. If the self-test fails the VAT will shutdown. If successful the VAT will give the "Please Insert Your Ballot" message. (Insert a blank CF card to ensure VAT will NOT boot up) <p><u>Paper based: Verify VAT & DS200 are ready for use:</u></p> <ul style="list-style-type: none"> - VAT & DS200 display "Please Insert Your Ballot" message. - Any failures provide a message for resolution - VAT holds the ballot securely - DS200 does not contain a frame or fixture for ballot marking - DS200 is attached to a custom DS200 ballot box; with locks and separate compartments; slots prevent unauthorized ballot insertion. Write-ins will be marked with a red circle to indicate review is necessary - VAT security seals are checked: compact flash compartment, top cover & ink compartment |
| Voting: Ballot Activation and Casting Verifications | See Appendix D | <p><u>VAT & DS200</u></p> <p>Protects secrecy of ballot/vote</p> <ul style="list-style-type: none"> - Voter can make selections based on ballot programming & indicate selection, cancellation, & non-selection (undervotes) - Gives feedback & an opportunity to correct or accept, before the ballot is counted <p><u>VAT BMD</u></p> <ul style="list-style-type: none"> - Control of ballot (single ballot cast per vote session) and content of ballot is restricted to the eligible voter - Correct ballot is presented (language, audio/visual, precinct/split) - Party affiliation content is controlled/activated via the "Party Preference" - Touching an area outside the identified selection box does not mark the ballot or display external information - Provides all displays, instructions, messages, alerts and status in multilingual audio & visual displays - Voters are able to edit and review write-ins. # of write-ins match Vote For. - Audio voting provides repeat functionality & volume control - Voter is allowed to mark the ballot, in any combination, or return it without marking (blank) - Overvote and Undervote provides alerts, with overvotes prevented - Summary screen is provided to signify end of candidate/measures and provides instructions to review/change selections prior to ballot marking - Verify alert of selection's complete, ballot is being marked, and to take completed ballot to tabulator <p><u>DS200</u></p> <ul style="list-style-type: none"> - Alert successful/unsuccessful storage of cast ballot; provide review & instruction to resolve unsuccessful casting (Query: Overvotes & Crossover ballots; Reject: Blank ballots and unreadable marks; Accept: undervote s) - Increments the ballot counter for successfully cast ballots - Print Precinct and Status reports to compare to vote data to verify actual votes cast is correct & undervotes/overvotes are counted separately - Access to voted ballot is prevented until after polls close (locked ballot box) |

| Method Detail | Reuse System Level Test Method | Regression System Level Test Method |
|--|--------------------------------|--|
| Voting: Voting System Integrity, System Audit, Errors & Status Indicators | See Appendix D | <p>The system audit provides a time stamped, always available, report of normal/abnormal events that can't be turned off when the system is in operating mode.</p> <ul style="list-style-type: none"> - Maintain accurate and complete audit records; verify at various points (After poll open; vote query, reject & accept: any abnormal event encountered in testing; poll close) - Self-tests and diagnostic messages for the hardware will be verified at poll open/close points in the test case <p>Status messages are part of the real time audit record.</p> <ul style="list-style-type: none"> - Critical status messages requiring operator intervention shall use clear indicators or text <p>Error messages are:</p> <ul style="list-style-type: none"> - Generated, stored & reported as they occur - Errors requiring intervention by the voter or poll worker clearly display issues & action instructions in easily understood text language or with indicators - The text for any numeric codes is contained in the error or affixed to the inside of the voting system - Incorrect responses will not lead to irreversible errors. - Nested conditions are corrected in the sequence to restore the system to the state before the error occurred |
| Post-vote: Closing the Polls | See Appendix D | <p><u>VAT:</u></p> <ul style="list-style-type: none"> - Turn VAT to 'Off' position & remove FMC to prevent further casting of ballots; verify a voting session cannot be activated. - Review the audit logs (only available report) to verify entries are in the proper sequence for operational tests, switching from test to vote modes, ballot printing, audit report access during voting , including complete & accurate error and status messages <p><u>DS200:</u></p> <ul style="list-style-type: none"> - Attempt to print reports while polls are open; verify this is prohibited. - Press 'Close Poll' button, a results report will print preventing further casting of ballots (attempt to scan a ballot without reopening the polls) - Visibly displays the status "Polls Closed" - Internally tests and verifies that the closing procedures have been followed and the device status is normal by preventing report printing or processing vote totals unless polls were properly closed. - Confirm polls cannot be reopened - Review the audit log to verify test records exists that verify entries for the proper sequence for operational tests, poll open; vote query, reject & accept: any abnormal event encountered in testing; poll close, including complete & accurate error and status messages - Print Status report, Race Results report, Certification report, Precinct Report Summary, Poll Report Summary and Audit Log report once polls are closed. Ensure undervote & overvote is counted. - Validate data from USB is extractable by transmitting results into ERM <p>Reopen the polls testing: (Copy election & test with settings for reopening the polls)</p> <ul style="list-style-type: none"> - Reopen of polls, enter an incorrect and then a correct password - Alert to resume voting or clear votes: select 'resume voting', do not clear votes - Status message "Please insert your ballot" is displayed - Cast a vote and close the polls. - Check audit for proper sequence for operational tests, poll open, vote accept, poll |

| Method Detail | Reuse System Level Test Method | Regression System Level Test Method |
|-----------------------------|--------------------------------|---|
| Post-vote: Central Count | See Appendix D | <p>close, reopen, password entry</p> <ul style="list-style-type: none"> - Verify correct vote totals. <p>Readiness Test:</p> <ul style="list-style-type: none"> - Obtain status, data reports, audit logs and other artifacts to confirm readiness - Verify test data has been cleared <p>M650: Readiness: Proper election is installed; all buttons, printers and screen function correctly; verify election name, equipment identification, polling place, ballot format and matching versions is printed on Machine Readiness and/or Zero count reports; confirmation that there are no hardware/software failures; and device is ready to be activated to accept votes. Perform: "Model 650 Election Day Checklist Version Numbers 2.2.1.0, February 29, 2008."</p> <ul style="list-style-type: none"> - Attempt to start the M650 with test totals. Verify a visual screen warning is provided if memory locations (including data on media) contains votes, and the reports/audit log contain a time-stamp record of the status of the votes/results memory and disk storage locations. If a unit or system contains a non-zero counter, a warning message is provided, along with corrective actions to resolve the votes. The unit is disabled until type of resolution is selected. <p>ERM: Readiness: confirm proper election is installed</p> <ul style="list-style-type: none"> - Attempt to read in vote totals with test totals present. Verify a visual screen warning is provided if memory locations contain votes, and the reports/audit log contain a time-stamped record of the status of the votes/results in the memory locations. If this is not provided, a corrective action message is provided along with a message indicating the attempt to read in vote totals, while there are totals present. <p>Vote Consolidation for M650:</p> <ul style="list-style-type: none"> - Votes match predicted votes (absentee) - Geographic reports of votes; each contest by precinct & other jurisdictional levels. <p>Reports include:</p> <p>Zero, Grand Totals (long format), Precincts Processed, Totals by Precinct (long format) Machine Readiness, Audit log. Ensure audit logs are accurate & complete and contain error and status messages.</p> <p>Vote Consolidation for ERM:</p> <p>Consolidated reported votes match predicted votes from polling places, & optionally other sources (absentee)</p> <ul style="list-style-type: none"> - Geographic reports of votes; each contest by precinct & other jurisdictional levels. <p>Reports include:</p> <ul style="list-style-type: none"> - Zero - Validate ERM Enhancement: RFI2008-07/ ENH14322 to ensure ERM is zeroed out before processing election results. - EL30A - Prec Report–Group Detail individual precincts & contest results. - EL45- Election Summary - total number of votes for each candidate/question & % of total vote for y each candidate/question - EL52D - Numbered Key–Districts only- summary report, by district, of each office - EL111 - Name Heading Canvass - statistics of total number of precincts counted, total number of votes cast for each candidate and % of total vote received by each candidate - EL50D - DS200 Precincts Processed Listing - DS200 machine IDs imported from the USB flash drive into ERM - Audit log. <ul style="list-style-type: none"> - Verify data from M650, DS200 is prevented from being altered or destroyed by report generation, or extraction from media - Verify DS200 SN is displayed in ERM, once the USB flash drive is read into ERM <p>Validate ERM Discrepancy #35, identified issue with the Canvass Numbered Key-District Report showing incorrect group descriptions. (Group 3 name/totals was being</p> |

| Method Detail | Reuse System Level Test Method | Regression System Level Test Method |
|----------------------------|--------------------------------|---|
| | | populated in Group 4 column) |
| Post-vote: Security | See Appendix D | <p>The central count: (See Security Test for detail)</p> <p>During execution confirm:</p> <ul style="list-style-type: none"> - Security access controls limit or detect access to critical systems& the loss of system integrity, availability, confidentiality and accountability - Functions are only executable in the intended manner, order & under the intended conditions - Prevented execution of functions if preconditions were not met - Implemented restrictions on controlled functions - Provided documentation of mandatory administrative procedures. <p>COTS systems</p> <ul style="list-style-type: none"> -Authentication is configured on the local terminal and external connection devices, -Operating systems are enabled for all session and connection openings, and closings, all process executions and terminations and for the alteration or detection of any memory or file object - Configure the system to only execute the intended and necessary processes during the execution of the election software. Election software process are halted until the termination of any critical system process, such as system audit. |
| Post-vote: System Audit | See Appendix D | <p>The system audit provides a central count time stamped always available, report of normal and abnormal events that cannot be turned off when the system is in operating mode. Status message are part of the real time audit record.</p> <p><u>Audit Messages to be validated:</u></p> <p>AM: Archive functionality</p> <p>EDM: Precinct set up</p> <p>ESSIM: 2 ballot styles created</p> <p>HPM: media is created for M650 & DS200</p> <p>VAT: date/time set</p> <p>DS200 & M650: Election id</p> <p>ERM: DS200 SN is recorded</p> <p>AIMS: IUImport - Performed full Unity election import</p> <p>DS200, M650 & ERM: Message of vote totals present, Corrective action messages to resolve residual vote totals</p> <p><u>Status/Error messages to be validated:</u></p> <p>AM: 1. Cannot delete 'Admin' user!</p> <p>EDM: 1. Minimum password length is 6 characters. 2. District Type Name can not be blank</p> <p>ESSIM: 1. Please Select a Ballot Style to Edit, 2. Please Enter a Style Sheet Name</p> <p>HPM: 1. Admin password is required</p> <p>VAT: 1. System Maintenance (requires password), 2. The Flash Card has been removed. Turn OFF the machine and insert a valid Flash Card.</p> <p>AIMS: Missing Translations</p> <p>DS200: 1. Blank Ballot Rejected, 2. More than one party has votes. Votes In Party Contests Will Be Ignored, 3. Ballot Jammed, 4. 119 – MULTIPLE BALLOTS DETECTED/Please Re-insert One Ballot After Beeps</p> <p>M650: 1. Back Door Open, 2. Ballot BACKWARDS or UPSIDE-DOWN!</p> <p>ERM: 1. ####-Not a valid precinct, 2. Canvass Left Edge Heading exceeds the maximum length of 20 for 1UP format report.</p> <p>DS200, M650 & ERM: Warning message of vote totals present, Corrective action messages to resolve residual vote totals</p> <p>Validate AM archive functionality as identified in discrepancy #48. (Data from the day selected does not archive.)</p> |

| Method Detail | Reuse System Level Test Method | Regression System Level Test Method |
|--|---|---|
| Expected Results are observed | SysTest Labs Unity 4.0.0.0 Test Plan identifies results validation: <ul style="list-style-type: none"> • Accept: expected results is observed • Reject: expected result is NOT observed • Not Testable (NT): rejection of a previous test step prevents validation of this step or this was tested in another test case • Not Applicable (NA): not applicable to the current test scope or to the component under review • Not Supported (NS): not supported in the current test scope | Review the test result against the expected result: <ul style="list-style-type: none"> • Accept: the expected result is observed • Reject: the expected result of the test case is not observed • Not Testable (NT): rejection of a previous test step prevents execution of this step, or tested in another TC. • Not Applicable (NA): not applicable to test scope |
| Record observations and all input/outputs for each election; | See Appendix D | All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results will be recorded in the test case. <ul style="list-style-type: none"> - Any failure against the requirements of the EAC guidelines will mean the failure of the system and shall be reported as such. - Failures will be reported to the vendor as Defect Issues in the Discrepancy Report. - The vendor shall have the opportunity to cure all discrepancies prior to issuance of the Certification Report. - If cures are submitted the applicable test will be rerun. Complete information about the rerun test will be preserved in the test case. The cure and results of the retest will be noted in the - Discrepancy Report and submitted as an appendix of the Certification Report. - Operations which do not fail the requirements but could be deemed defects or inconsistent with standard software practices or election practices will be logged as Informational Issues on the Discrepancy Report. It is the vendor's option to address these issues. Open items will be identified in the report. |

7.2 Volume (Volume, Stress, Performance and Error Recovery

Table 18 - Volume, Stress, Performance & Error Recovery Test Methods 1 & 2

| Method Detail | Volume 1 Test Method | Volume 2 Test Method |
|--|---|--|
| Test Case Name | Volume 1 - Maximum Precincts and Ballot Styles for paper | Volume 2 - Maximum Ballot Styles in a Single Precinct |
| Scope - identifies the type of test | The scope of this test 2900 precinct, 1639 ballot styles: Scenario 1) The maximum allowed number of precincts with the maximum number ballot styles allowed for paper based systems. To verify that errors are generated in scenarios 2: Scenario 2) Exceeding the maximum number of Precincts and the maximum number of ballot styles. | The scope is to test: Scenario 1) The maximum allowed number of 40 ballot styles on the DS200 within a single precinct. To verify that errors are generated in scenarios 2: Scenario 2) Exceeding the maximum allowed number of 40 ballot styles on the DS200 within a single precinct. Scenario 3) The maximum allowed number of 100 ballot styles on the M650 within a single precinct. To verify that errors are generated in scenarios 4: Scenario 4) Exceeding the maximum allowed: number of ballot styles within a single precinct. |
| Test Objective | The objective is to validate the ability to process, store and report data using the allowed maximum number of precincts and ballot styles within an election. To validate that the system generates errors during EMS ballot preparation (ballot preparation including: EDM, ESSIM & HPM) when exceeding the maximum numbers of precincts and ballot styles. Validating the processing, storing and reporting shall occur without system degradation. If there are system errors that cause the system to crash the system shall recover without any loss of data. | The objective is to validate the ability to process, store and report data using the allowed maximum number of ballot styles within a single precinct. To validate that the system generates errors during EMS ballot preparation (ballot preparation including: EDM, ESSIM & HPM) when exceeding the maximum numbers of ballot styles within a single precinct. Validating the processing, storing and reporting shall occur without system degradation. If there are system errors that cause the system to crash the system shall recover without any loss of data. |
| Test Variables: Volume Stress Performance | General election Local offices Vote for 1 4 Ovals per Inch ballot - (14 inch ballot, 48 ovals positions per Column, 6 | General election Partisan/non-partisan offices Vote for 1 (contest 1 & 2) Vote for N of M (contests 3, 4, & 5) |

| Method Detail | Volume 1 Test Method | Volume 2 Test Method |
|---|--|---|
| | <p>columns per ballot, 288 total oval positions) 4 candidates per contest Election Day (DS200 and VAT) Absentee Voting (M650) one tabulator Scenario 1) 2900 precincts with 1639 ballot styles (Maximum precincts/Maximum ballot styles)</p> <p>- Contests 1 - 290 in Polling Places 1 -29 (10 precincts to a polling place, 1 contest to a precinct) total of 290 ballot styles - No contest/Precincts assigned to Polling Places 29 -290 - Contests 291 - 1638 in Polling Places 291- 1638 (1 precinct to a polling Place, 1 contest to a polling place) 1348 ballot styles - Contest 1639 in Polling Place 1639 - 2900 with Precincts 1639 - 2900 (1 contest in 1 all precincts, and all polling places) 1 ballot style</p> <p>TOTALS 1639 Ballot Styles 2900 Precincts 1639 contest 2639 Polling Places</p> <p>Scenario 2) 2901 Precincts with 1639 ballot styles(over the Maximum precincts/Maximum ballot styles) Add a new contest 1640 to a new Precinct 2901</p> <p>TOTALS 1640 Ballot Styles 2901 Precincts 1640 contest 2640 Polling Places</p> | <p>one page ballot multi page ballot Certified Write-Ins 5 contest for each ballot style (M650 has a total of 500 contest, DS200 has a total of 200 contest) Election Day Voting (DS200 and VAT) Absentee Voting (M650) 4 candidates for each contest 4 Ovals per Inch ballot - (19 inch ballot, 68 ovals positions per Column, 6 columns per ballot, 408 total oval positions)</p> <p>Scenario 1) 1 precinct with 40 Ballot Styles on the DS200 & the VAT (DS200 Maximum ballot styles) Scenario 2) 1 precinct with 41 Ballot Styles on the DS200 & the VAT (Over the DS200 Maximum ballot styles)</p> <p>Scenario 3) 1 Precinct with 100 ballot styles on the M650 & the VAT (M650 Maximum ballot styles per precinct) Scenario 4) 1 Precinct with 101 ballot styles on the M650 & the VAT (M650 Maximum ballot styles per precinct) (Over the maximum ballot styles)</p> |
| A description of the voting system type and the operational environment | The Unity 3.2.0.0 EMS Ballot Preparation includes: | <ul style="list-style-type: none"> Same as Volume 1 - Maximum Precincts and Ballot Styles except: - 1 platform of each |
| VSS 2002 vol. 1 | <p>The Unity 3.2.0.0 EMS Ballot Preparation includes: Audit Manger (AM), Election Data Manger (EDM), (ESSIM), hardware Program Manger (HPM), AutoMARK Information (AIMS) 2 @ Unity 3.2.0.0 marking device: Voter Terminal(VAT) 2 @ Unity 3.2.0.0 precinct count includes: DS200 Unity 3.2.0.0 central count tabulator: Model 650 (M650) Unity 3.2.0.0 central count tally: Election Reporting Manager (ERM)</p> | <ul style="list-style-type: none"> Same as Volume 1 - Maximum Precincts and Ballot Styles |
| VSS 2002 vol. 2 | <p>6.2.3 Volume (maximum number of ballot styles) A4.3.5 Volume (maximum and exceeding more than the maximum number of precincts) A4.3.5 Volume/Stress (Processing, storing and reporting data when overloading the number of precincts and ballot styles) A4.3.5 Performance/Recovery (Ballot format handling capability-graceful shut down and recovery without loss of data) A4.3.5 Performance/Recovery (Processing rates-graceful shut down and recovery without loss of data)</p> | <p>6.2.3 Volume (maximum number of ballot styles/precincts) A4.3.5 Volume/Stress (Processing, storing and reporting data when overloading the number of ballot styles/precincts) A4.3.5 Performance/Recovery (Ballot format handling capability-graceful shut down (no crash) and recovery without loss of data) if the number of ballot styles/precincts is exceeded A4.3.5 Performance/Recovery (Processing rates-graceful shut down and recovery without loss of data)</p> |
| Hardware, Software voting system configuration and test location | <p>The Unity 3.2 Voting System consist of the following: Audit Manger (AM), Election Data Manger (EDM), (ESSIM), hardware Program Manger (HPM), DS200, Model 650 (M650), Election Reporting Manager (ERM), AutoMARK Information (AIMS), Voter Terminal(VAT)</p> <p>All testing will be perform by iBeta LLC located at 3131 S. Vaughn Way, Aurora,</p> | <ul style="list-style-type: none"> Same as Volume 1 - Maximum Precincts and Ballot Styles |

| Method Detail | Volume 1 Test Method | Volume 2 Test Method |
|--|---|--|
| | CO 80014. | |
| Pre-requisites and preparation for execution of the test case. | <p>Complete the prerequisites; Test Method Validation: Technical review conducted by C. Coggins; Approved 3/4/09 for validation of test method as defined in ISO/IEC 17025 clause 5.4.5. -</p> <p>Condition of approval - iBeta validated the successful use of the Import Wizard to import large amounts of data into EDM. As configuration of the imported file can impact the success of the data importation, the import file structure must be validated as a prerequisite of all applicable test cases. Import Wizard method tested and validated: is pending. - Document in the test case the percentage that the system limit exceeds the customer maximum. (System Limit * 100) /Customer Maximum =% System Limit) - Record the testers & date - System has been set up as identified in the user manual - Gather any necessary materials or manuals. - Ensure customization of the test case template is complete - Order ballots - Set Election Date: 11/03/2009 - 8 Excel spreadsheets saved as "Tab Delimited". Tab Delimited documents containing election creating information will be imported into EDM using the Import Wizard option. Spreadsheet 1 - Precinct 2900 Spreadsheet 2 - District Types 1639 Spreadsheet 3 - Districts Names 1639 Spreadsheet 4 - District Relations 1639 Spreadsheet 5 - Master Office 1639 Spreadsheet 6 - Office Relations 1639 Spreadsheet 7 - Candidates 6556 Spreadsheet 8 - Polls 2639 Spreadsheet 9 - Poll Relations 2639</p> | <p>Complete the prerequisites: Test Method Validation: Technical review conducted by C. Coggins; Approved 1/26/09 For validation of test method as defined in ISO/IEC 17025 clause 5.4.5. -</p> <p>Condition of approval - iBeta validated the successful use of the Import Wizard to import large amounts of data into EDM. As configuration of the imported file can impact the success of the data importation, the import file structure must be validated as a prerequisite of all applicable test cases. Import Wizard method tested and validated: 1/23/09. - Document in the test case the percentage that the system limit exceeds the customer maximum. (System Limit * 100) /Customer Maximum =% System Limit) - 7 Excel spreadsheets saved as "Tab Delimited". Tab Delimited documents containing election creating information will be imported into EDM using the Import Wizard option for Scenario 1 & 2. Spreadsheet 1 - Precinct 1 Splits 1 - 40 & 1-41 Spreadsheet 2 - District Types 1-100 Spreadsheet 3 - Districts Names 1-100 Spreadsheet 4 - District Relations 1-100 Spreadsheet 5 - Master Office 1-200 Spreadsheet 6 - Office Relations 1-200 Spreadsheet 7 - Candidates 1-800 - 7 Excel spreadsheets saved as "Tab Delimited". Tab Delimited documents containing election creating information will be imported into EDM using the Import Wizard option for Scenario 3 & 4. Spreadsheet 1 - Precinct 1 Splits 1 - 100 & 1-101 Spreadsheet 2 - District Types 1-250 Spreadsheet 3 - Districts Names 1-250 Spreadsheet 4 - District Relations 1-250 Spreadsheet 5 - Master Office 1-500 Spreadsheet 6 - Office Relations 1-500 Spreadsheet 7 - Candidates 1-2000</p> |
| Getting Started Checks | <p>Check the voting system to :</p> <ul style="list-style-type: none"> - Verify the test environment and system configuration is documented in the PCA Configuration and matches the system used in the 48 hr. temp & power variation test and vendor described configuration. - Validate installation of the witnessed build - Testers understand that no change shall occur to the test environment without documentation in the test record and the authorization of the project manager. - During testing an operational readiness test will be performed. | <p>Check the voting system to:</p> <ul style="list-style-type: none"> - Same as Volume 1 - Maximum Precincts and Ballot Styles |
| Documentation of Test Data & Test Results | <p>Test Data:</p> <ul style="list-style-type: none"> - Record all programmed & observed election, ballot & vote data fields and field contents on the corresponding tabs to provide a method to repeat the test - Preserve all tabs for each instance the test is run. <p>Test Results:</p> <ul style="list-style-type: none"> - Enter Accept/Reject on the Test Steps - In Comments enter any deviations, discrepancies, or notable observations - Log discrepancies on the Discrepancy Report and insert the discrepancy number in the Comments field of Test Step. | <p>Test Data:</p> <ul style="list-style-type: none"> - Same as Volume 1 - Maximum Precincts and Ballot Styles |
| Volume: Paper-based voting systems Processing | <p>Ballot Prep:</p> <p>Scenario 1)</p> <ul style="list-style-type: none"> - 4 candidates per contest - 1639 Ballot Styles | <p>Ballot Prep:</p> <p>Scenarios 1 & 3 maximum limits:</p> <ul style="list-style-type: none"> - An election database can be accurately/securely defined & formatted using the Import Wizard. and containing |

| Method Detail | Volume 1 Test Method | Volume 2 Test Method |
|----------------|--|---|
| | <ul style="list-style-type: none"> - 2900 Precincts - 1639 contest - 2639 Polling Places -An election database can be accurately/securely defined & formatted using the Import Wizard. - Set up election by Style -Ballots (candidates & propositions) can be accurately defined & generated. - Check EDM reports for election set up Election media can be installed - If there are any system errors that cause the EMS ballot preparation applications to crash then verify the applications recover without any loss of data. <p>Scenario 2)</p> <ul style="list-style-type: none"> - 4 candidates per contest - 1640 Ballot Styles - 2901 Precincts - 1640 contest - 2640 Polling Places <p>Test execution of Scenario 2 & 3 stop at this point with errors generated prior to the creation of election media in ballot preparation)</p> <ul style="list-style-type: none"> - Check audit logs for critical status messages. Test stops unless system does not error and creates media) - If EDM does not error during the "Ballot Sets Merge" then the EDM reports must be reviewed to verify 2901 precincts and 1640 ballot styles have been created and assigned to Early Voting Polling Places. Continue to ESSIM and HPM. The system should display a critical status message prior to exiting the HPM. - 2901 Precincts in an election -1640 ballot styles in an election - If there are any system errors that cause the EMS ballot preparation applications to crash then verify the applications recover without any loss of data. | <p>1 Precinct</p> <p>Vote for 1 (contest 1 & 2) & Vote for N of M (contest 3,4, & 5)</p> <p>19 inch ballot</p> <p>5 contest for each ballot style</p> <p>4 candidates for each contest</p> <ul style="list-style-type: none"> - Check EDM reports for election set up <p>Scenario 1) -Election day (DS200)</p> <p>-40 Ballot Styles on the (DS200 Maximum ballot styles)</p> <p>-Election set up for the DS200 & VAT devices</p> <p>Scenario3) -Absentee voting (M650)</p> <p>-100 Ballot Styles on the (M650 Maximum ballot styles)</p> <p>-Election set up for the M650 & VAT devices</p> <p>- If there are any system errors that cause the EMS ballot preparation applications to crash then verify the applications recover without any loss of data.</p> <p>Scenarios 2 & 4 Exceeding limits:</p> <p>Test execution of Scenario 2 & 4 stop at this point with errors generated prior to the creation of election media in ballot preparation</p> <ul style="list-style-type: none"> - Check audit logs for critical status messages. Test stops unless system does not error and creates media - If EDM does not error during the "Ballot Sets Merge" then the EDM reports must be reviewed to verify the DS200 has 41 ballot styles and the M650 has 101 ballot styles have been created and assigned to Election Day Polling Places. Continue to ESSIM and HPM. The system should display a critical status message prior to exiting the HPM. <p>Same as Scenario 1 except:</p> <p>Scenario2) -Election day (DS200)</p> <p>-41 Ballot Styles on the DS200</p> <p>Same as Scenario 3 except:</p> <p>Scenario 4) -Absentee voting (M650)</p> <p>-101 Ballot Styles on the</p> <p>-Election set up for the M650 & VAT devices</p> <p>- If there are any system errors that cause the EMS ballot preparation applications to crash then verify the applications recover without any loss of data.</p> |
| Volume: | <p>System response to processing more than the expected number of precincts and maximum number of ballot styles.</p> <p>Maximum capacity is successfully processed without errors.</p> <p>System's capacity to process, store, and report data.</p> <ul style="list-style-type: none"> - When importing the allowed precincts and/or ballot styles into the EDM using the Import Wizard errors are generated | <p>Same as Volume 1 - Maximum Precincts and Ballot Styles; except</p> <p>- the system responds to processing more than the expected number of ballot styles in a single precinct</p> |
| Stress | <p>System responses to overloading conditions. Exceeding the maximum allow number precincts and ballot styles by sequence.</p> | <p>System provides a response to an overloading condition: Exceeding the maximum allow number of ballot styles in a single precinct.</p> |
| Performance | <p>No system degradation(Ballot format handling capability and Processing rates):</p> <ul style="list-style-type: none"> -When importing large amount of data into the EDM using the Import Wizard. -When installing an election with 2900 precincts and 1639 ballot styles onto 1 device (DS200, M650, and VAT) -When uploading 2900 precinct results into ERM - The system will not slow down throughout the testing | <p>There is no system degradation (ballot format handling capability and processing rates):</p> <ul style="list-style-type: none"> -When importing large amount of data into the EDM using the Import Wizard. -When installing an election with 1 precinct and over the maximum number of ballot styles for a give device - The system will not slow down as more and more data is added |
| Error Recovery | <p>Voting system gracefully shuts down (no crash) and recovers from errors caused by overloading the number of precincts and ballots styles.</p> <ul style="list-style-type: none"> - Ballot format handling capabilities and processing capabilities-graceful shut down and recover without loss of data - Critical Status Messages | <p>Same as Volume 1 - Maximum Precincts and Ballot Styles; except - the errors are caused by overloading the number ballots styles per precinct.</p> |

| Method Detail | Volume 1 Test Method | Volume 2 Test Method |
|--|--|--|
| Readiness Testing and Poll Verification | Voting system is ready for the election: - The election is correctly installed (Election ID, polling place name, precincts) - Test data (run 10 different precincts to validate the system is ready) is segregated from voting data, with no residual effect Test confirmation that there are: - No hardware/software failures - The device is ready to be activated to accept votes (No Identification of any failures & corrective action) | Same as Volume 1 - Maximum Precincts and Ballot Styles; except - The device is ready to be activated to accept votes with the maximum ballot styles per a single precinct (No Identification of any failures & corrective action) |
| Pre- vote: Opening the Polls Verification | Precinct Count/ Paper based: - Zero count report | Precinct Count/ Paper based: - Zero count report (verify no votes are on the DS200 prior to starting Election Day voting) |
| Voting: Ballot Activation and Casting Verifications | Protects secrecy of ballot/vote - Mark ballots using the VAT - The DS200 Election Day - Vote a 10% sample of the 2900 precincts - Vote using the from 290 precincts each with a different ballot style - Each precinct will contain 1 contest with 4 candidates Scenario 2) Errors should prevent the tests from reaching this point. If the test does get to this point: - Load election - No system failures that cause the DS200 and VAT to crash - If there are any system errors that cause the DS200 and VAT to crash then the DS200 and VAT shall recover without any loss of data. | Protects secrecy of ballot/vote Scenario 1) - 20 ballots will be test (a 50% sample of 40 ballot styles) - VAT -Generate the ballots for 20 different ballot styles within the deck. - DS200- scans the ballots generated by the VAT with different ballot styles within the deck. - Ballot styles 10 through 30 will be voted - The DS200 In Election Day mode with a single precinct and 40 ballot styles will not error will not error. If there are any system errors that cause the DS200 to shut down then the DS200 shall recover without any loss of data. - The VAT with a single precinct and 40 ballot styles will not error. If there are any system errors that cause the VAT to shut down then the VAT shall recover without any loss of data. Scenario 2) Errors should prevent the test from reaching this point. If the test does get to this point: DS200 and VAT - Load election - No system failures that cause the DS200 and VAT to crash - If there are any system errors that cause the DS200 and VAT to crash then the DS200 and VAT shall recover without any loss of data. |
| Voting: Voting System Integrity, System Audit, Errors & Status Indicators | The system audit provides a time stamped, always available, report of normal/abnormal events found within the 10% sampling tested. Error messages are: - Are generated, stored & reported as they occur - Errors requiring intervention by the voter or poll worker clearly display issues & action instructions in easily understood text language or with indicators - Incorrect responses will not lead to irreversible errors. | Same as Volume 1 - Maximum Precincts and Ballot Styles; except -report of normal/abnormal events is found within the 50% sample. |
| Post-vote: Closing the Polls | Once the polls are closed the voting system - Printed reports of ballots counted by tabulator - Reported votes match predicted votes from tabulator with votes and undervotes. | Once the polls are closed the voting system - Printed reports of ballots counted on the DS200 - Reported votes match predicted votes from tabulator with votes and undervotes - DS200 Prints a single precinct totals report totaling all ballot styles within the precinct (Election Day voting ends) |
| Post-vote: Central Count | Paper Based: When loading results mix the input of results such that media is read out of precinct order and where possible mix the reading of DS200 and M650 results. Record the order at test execution. Scenario 1) The central count voting system includes: - Election identification - M650 is used for absentee ballots - Zero count report (to verify no votes are on the M650 prior to starting absentee voting) - If there are any system errors that cause the M650 to shut down or crash then | Paper Based: Scenario 2) - Election identification - Zero count report (to verify no votes are on the M650 prior to starting absentee voting) - 20 ballots will be test (a 20% sample of 100 ballot styles) - VAT -Generate the ballots for 20 different ballot styles within the deck. - M650- scans the ballots generated by the VAT with different ballot styles within the deck. - Ballot styles 10 through 30 will be voted - The M650 is used for Absentee ballots with a single precinct and 100 ballot styles will not error will not error. If there are any system errors that cause the M650 to shut down |

| Method Detail | Volume 1 Test Method | Volume 2 Test Method |
|--|---|---|
| | <p>the M650 shall recover without any loss of data.</p> <p>-M650s scan the ballots generated by the VAT with different precincts/ballots styles within the deck.</p> <p>Reports include:</p> <ul style="list-style-type: none"> - Printed reports of ballots counted by tabulator, with votes and undervotes <ul style="list-style-type: none"> - Printer Summary Report (containing all precincts) - View (save to disk) Precinct by Precinct Reports but do not print <p>Scenario 2) Errors should prevent the test from reaching this point. If the test does get to this point:</p> <ul style="list-style-type: none"> - Load election - No system failures that cause the M650 or in the EMS ERM application to crash - If there are any system errors that cause the M650 or in the EMS ERM application to crash then the M650 or in the EMS ERM application shall recover without any loss of data. | <p>then the M650 shall recover without any loss of data.</p> <p>Scenario 1 & 3) Vote Consolidation: ERM consolidated reports match the predicted votes from the polling places</p> <p>Reports include:</p> <ul style="list-style-type: none"> - Printed reports of ballots counted by tabulator, with votes and undervotes <ul style="list-style-type: none"> - Print Summary Report (containing all a single precinct) - View and Print Precinct by Precinct Reports <p>Scenario 4) Errors should prevent the test from reaching this point. If the test does get to this point: M650</p> <ul style="list-style-type: none"> - Load election - No system failures that cause the M650 to crash - If there are any system errors that cause the M650 to crash then the M650 shall recover without any loss of data. <p>Scenario 2& 4) Errors should prevent the test from reaching this point. If the test does get to this point: ERM</p> <ul style="list-style-type: none"> - Load election - No system failures that cause the ERM application to crash - If there are any system errors that cause the ERM to crash then the ERM application shall recover without any loss of data. |
| Expected Results are observed | <p>Review the test result against the expected result:</p> <ul style="list-style-type: none"> • Accept: the expected result is observed • Reject: the expected result of the test case is not observed • Not Testable (NT): rejection of a previous test step prevents execution of this step, or tested in another TC. • Not Applicable (NA): not applicable to test scope | <p>Review the test result against the expected result:</p> <p>Same as Volume 1 - Maximum Precincts and Ballot Styles</p> |
| Record observations and all input/outputs for each election; | <p>All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results will be recorded in the test case.</p> <ul style="list-style-type: none"> - Any failure against the requirements of the EAC guidelines will mean the failure of the system. and shall be reported as such. - Failures will be reported to the vendor as Defect Issues in the Discrepancy Report. - The vendor shall have the opportunity to cure all discrepancies prior to issuance of the Certification Report. - If cures are submitted the applicable test will be rerun. Complete information about the rerun test will be preserved in the test case. The cure and results of the retest will be noted in the - Discrepancy Report and submitted as an appendix of the Certification Report. - Operations which do not fail the requirements but could be deemed defects or inconsistent with standard software practices or election practices will be logged as Informational Issues on the Discrepancy Report. It is the vendor's option to address these issues. Open items will be identified in the report. | <p>All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results will be recorded in the test case.</p> <p>Same as Volume 1 - Maximum Precincts and Ballot Styles</p> |

Table 19 - Volume, Stress, Performance & Error Recovery Test Methods 3 & 4

| Method Detail | Volume 3 Test Method | Volume 4 Test Method |
|-------------------------------------|---|--|
| Test Case Name | Volume 3 - Audit Manager database test | Volume 4 - Storage Error Generation |
| Scope - identifies the type of test | The scope is to test is to confirm that 2GB JET database can record and store audit inputs generated in the Election Data Manger for a period of 72 consecutive hours (150% of the ES&S predicted maximum). | The Test Scope is to test: The M650 and DS200 component media generate an error messages when capacity is reached |

| Method Detail | Volume 3 Test Method | Volume 4 Test Method |
|---|---|--|
| Test Objective | The objective is to validate that the Audit Manager capacity can record and retain data inputs (150%) of the ES&S predicted maximum time of use in an election. (48 hours estimated maximum run for 72 consecutive hours). Throughout the 72 hours of testing the application should not have any system crashes, loss of data and/or loss of degradation. If there are system errors that cause the system to crash the system shall recover without any loss of data. | The objective is to validate that error messages are generated when media capacity has been reached. |
| Test Variables: | General election - • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper except: - only using Scenario 1 | Same as Volume 7 - Maximum ballot limitations except: 512MB USB (491 free space) for the DS200 with over 488MB of storage used. 100MB for the M650 with over 85MB of storage used. |
| A description of the voting system type and the operational environment | The Unity 3.2.0.0 EMS Ballot Preparation includes: Audit Manger (AM) and Election Data Manger (EDM) | The Unity 3.2.0.0 precinct count includes: DS200 The Unity 3.2.0.0 central count tabulator: Model 650 (M650) |
| VSS 2002 vol. 1 | 2.1.5.1b Audit/Error message 2.2.5.2.3 Status message 5.4.1 Audit/description of modifications with time stamp 2.2.3 Error Recovery | 2.2.5.2.2 System Audit Error Messages 2.2.5.2.3 System Audit Status Messages |
| VSS 2002 vol. 2 | A4.3.5 Volume (Processing, storing and reporting data when overloading the systems capacity) A4.3.5 Performance/Recovery (Ballot format handling capability-graceful shut down and recovery without loss of data) A4.3.5 Performance/Recovery (Processing rates-system does not slow down as more data is being added, no loss of data, and no system crashes) Stress - overloading conditions over a consecutive period of 72 hours. | A4.3.5 Performance/Recovery (Processing rates-graceful shut down "no system crash" and recovery without loss of data) A4.3.5 Stress (system response to overloading data on hardware media) |
| Hardware, Software voting system configuration and test location | The Unity 3.2 Voting System consist of the following: Audit Manger (AM) and Election Data Manger (EDM) All testing will be perform by iBeta LLC located at 3131 S. Vaughn Way, Aurora, CO 80014. | The Unity 3.2 Voting System consist of the following: DS200, Model 650 (M650) All testing will be perform by iBeta LLC located at 3131 S. Vaughn Way, Aurora, CO 80014. |
| Pre-requisites and preparation for execution of the test case. | Complete the prerequisite • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper Test Method Validation: Technical review conducted by C. Coggins; Approved 2-15-09. for validation of test method as defined in ISO/IEC 17025 clause 5.4.5. • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper except - only using Scenario 1 | Complete the prerequisites; Test Method Validation: Technical review conducted by C. Coggins; Approved 2/23/09. for validation of test method as defined in ISO/IEC 17025 clause 5.4.5. - Condition of approval - iBeta validates component media can be populated to near capacity prior to test execution. |
| Getting Started Checks | Check the voting system to : • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper | Check the voting system to : • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper |
| Documentation of Test Data & Test Results | Test Data: • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper | Test Data: • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper |
| Volume: Paper-based voting systems Processing | Ballot Prep: Using an automation tool run the EDM and AM application for 72 hours consecutively importing election data. - Automation Anywhere - EDM Import Wizard options - Same spreadsheets as Volume 1 - Maximum Precincts Limitations and ballot styles for paper | Same as Volume 7 - Maximum ballot limitations |
| Volume: | System responses when attempting to overload the systems capacity: - Successfully processed without errors. - Process, store, and report data. | Not Applicable (only testing for error generation of full media on hardware) |

| Method Detail | Volume 3 Test Method | Volume 4 Test Method |
|--|---|--|
| Stress | System responses when attempting to overload conditions within 72 hours. | Not Applicable (only testing for error generation of full media on hardware) |
| Performance | No noticeable system degradation (Processing rates): -during the 72 consecutive hours of operation and accessing the Audit Manager logs. | No system degradation (Ballot Processing rate): - On the M650 and DS200 with a large amount of data filling up the media storage the system will not be observed to slow down throughout the testing |
| Error Recovery | The Audit Manager application should not error or crash within the 72 consecutive hours. - If the application does error the system shall provide a clear description of the problem. - If there are any system errors that cause the Audit Manager application to crash then the application shall recover without any loss of data. | The systems should not error or crash. - If the application does error the system shall provide a clear description of the problem. |
| Readiness Testing and Poll Verification | Not Applicable (Audit Manager is not located at the polls) | Not Applicable (only testing for error generation of full media on hardware) |
| Pre- vote: Opening the Polls Verification | Not Applicable (Audit Manager is not located at the polls) | Pre-Vote: -Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper |
| Voting: Ballot Activation and Casting Verifications | Not Applicable (Audit Manager is not located at the polls) | DS200 Only- Election Day Voting - in Polling Place 1 Precincts/Ballot Style 1. - Using media that is near capacity scan the marked 20 ballots from Volume 7 ballots until the error "Full memory" is generated. - error message must advise the official how to handle the error. - If there are any system errors that cause the DS200 to crash then verify the DS200 will recover without any loss of data. |
| Voting: Voting System Integrity, System Audit, Errors & Status Indicators | Not Applicable (Audit Manager is not located at the polls) | The system audit provides a time stamped, report of normal/abnormal events found within the tested. Error messages are: - Are generated, stored & reported as they occur - Errors requiring intervention by the poll worker clearly display issues & action instructions in easily understood text language or with indicators - Incorrect responses will not lead to irreversible errors. |
| Post-vote: Closing the Polls | Not Applicable (Audit Manager is not located at the polls) | Not Applicable (only testing for error recovery of full media on hardware) |
| Post-vote: Central Count | Not Applicable (Audit Manager is not located at the Central Count) | M650 Paper Based: The central count voting system includes: - Zero count report (Absentee) - using media that is near capacity scan the marked 20 ballots from Volume 7 ballots until an error "Full memory" generated. - If there are any system errors that cause the M650 to crash then the M650 shall recover without any loss of data. ERM consolidated reports match the predicted votes. (only testing for error recovery of full media on hardware) |
| Expected Results are observed | Review the test result against the expected result: • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper | Review the test result against the expected result: • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper |
| Record observations and all input/outputs for each election; | All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results will be recorded in the test case. • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper | All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results will be recorded in the test case. • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper |

Table 20 - Volume, Stress, Performance & Error Recovery Test Methods 5 & 6

| Method Detail | Volume 5 Test Method | Volume 6 Test Method |
|----------------|---------------------------------------|---|
| Test Case Name | Volume 5 - Electrical Supply Recovery | Volume 6 - Maximum number precincts and Maximum number of candidates per polling place. |

| Method Detail | Volume 5 Test Method | Volume 6 Test Method |
|---|---|---|
| Scope - identifies the type of test | Recovery tests verify the ability of the system to recover from hardware and data errors. Power recovery was tested by SysTest in the Electrical Supply Test Case. ES&S has petitioned the EAC for reuse of the applicable components in scope for Unity 3.2.0.0 from the SysTest Labs testing of the Unity v.4.0.0.0 certification test effort. Determination of reuse is based upon the EAC review of SysTest Labs Electrical Supply test results. iBeta incorporates verification of audit logging of error recovery in the Volume test cases. | The scope is to: Scenario 1) Test the maximum allowed: number of precincts and Maximum number of candidates per polling place. To verify that errors are generated when: Scenario 2) Exceeding the HPM maximum allowed: number of precincts in a single polling place |
| Test Objective | The objective of the test case is to verify the ability of the system to recover from electrical supply errors. | The objective is to validate the ability to process, store and report data to the maximum and exceeding the maximum allowed number of precincts in a single polling place. To validate that the system generates errors during EMS ballot preparation (ballot preparation including: EDM, ESSIM & HPM) when exceeding maximum the allowed number of precincts in a single polling place. Validating the processing, storing and reporting shall occur without system degradation. If there are system errors then the system shall recover without any loss of data. |
| Test Variables: Volume Stress Performance Error Recovery | The test variables for the SysTest Labs' Electric Supply test case is contained in Rev. 10 of the EAC approved Unity v.4.0.0.0 Test Plan and the associated test case. The test variables for the iBeta Volume Test Methods are identified in Volume Tests 1 through 10 | General election Scenario 1) - DS200 set up for Early Voting - 19 inch ballot (4 Ovals per inch) - 1900 precincts (early voting) - 7 ballot styles - 7 Non-Partisan contest - Precincts 1 - 6 with each will a single contest containing 175 candidates per contest (6 ballot style) - Precincts 7 - 1900 with 150 candidates in a single contest (1 ballot style) - Vote for 1 - 1 Statistical Counters (Precincts Counted) - 1 Polling Place Scenario 2) Same as scenario 1 except: - 8 ballot styles - 8 Non-Partisan contest - Precincts 1901 with 2 candidates in a single new contest (1 new ballot style, 1 new precincts , 1 new contest, same polling place as in Scenario 1) |
| A description of the voting system type and the operational environment | The voting system type and operational environment for SysTest Labs' usability, accessibility and maintainability testing is identified in Rev. 10 of the EAC approved Unity v.4.0.0.0 Test Plan | • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper |
| VSS 2002 vol. 1 | 2.2.5.2.2 Audit/Error messages 2.2.3.2.3 Audit/Status messages 2.2.3 Error Recovery | • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper |
| VSS 2002 vol. 2 | A4.3.5 Stress (high volume with interrupts and overloading the systems) A4.3.5 Recovery (system recovers from software and hardware errors without loss of data) | A4.3.5 Volume (maximum and exceeding more than the maximum number of precincts in a Polling Place) A4.3.5 Volume/Stress (Processing, storing and reporting data when overloading the number of precincts in a Polling Place) A4.3.5 Performance/Recovery (Ballot format handling capability-graceful shut down and recovery without loss of data) A4.3.5 Performance/Recovery (Processing rates-graceful shut down and recovery without loss of data) |
| Hardware, Software voting system configuration and test location | The hardware, software voting system configuration and location of testing for SysTest Labs' Electrical Supply testing is identified in Rev. 10 of the EAC approved Unity v.4.0.0.0 Test Plan iBeta - Same as identified in Volume Tests 1 through 10 | Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper |

| Method Detail | Volume 5 Test Method | Volume 6 Test Method |
|--|--|---|
| Pre-requisites and preparation for execution of the test case. | <p>Complete the prerequisites:</p> <ul style="list-style-type: none"> - Document in the test case the percentage that the system limit exceeds the customer maximum. (System Limit * 100) /Customer Maximum =% System Limit) <p>Test Method Validation: Technical review conducted by C. Coggins; Approved 2/4/09 for validation of test method as defined in ISO/IEC 17025 clause 5.4.5.</p> <p>Determination by the EAC allowing the reuse of SysTest Labs Electrical Supply test.</p> <p>iBeta Volume test cases have been executed and passed</p> | <p>Complete the prerequisites:</p> <p>Test Method Validation: Technical review conducted by C. Coggins; Approved 1/27/09 for validation of test method as defined in ISO/IEC 17025 clause 5.4.5.</p> <p>Condition of approval - iBeta validated the successful use of the Import Wizard to import large amounts of data into EDM. As configuration of the imported file can impact the success of the data importation, the import file structure must be validated as a prerequisite of all applicable test cases.</p> <ul style="list-style-type: none"> - Document in the test case the percentage that the system limit exceeds the customer maximum. (System Limit * 100) /Customer Maximum =% System Limit) <p>Import Wizard method tested and validated:</p> <ul style="list-style-type: none"> - 6 Excel spreadsheets saved as "Tab Delimited". Tab Delimited documents containing election creating information will be imported into EDM using the Import Wizard option. <ul style="list-style-type: none"> Spreadsheet 1 - Precinct 1900 Spreadsheet 2 - District Types 7 Spreadsheet 3 - Districts Names 7 Spreadsheet 4 - District Relations 7 Spreadsheet 5 - Master Office 7 Spreadsheet 6 - Office Relations 7 |
| Getting Started Checks | Same as identified in Volume Tests 1 through 10 | <p>Check the voting system to :</p> <p>Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper</p> |
| Documentation of Test Data & Test Results | Same as identified in Volume Tests 1 through 10 | <p>Test Data:</p> <p>Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper</p> |
| Volume: Paper-based voting systems Processing | Not applicable to Electrical Supply Recovery | <p>Ballot Prep:</p> <ul style="list-style-type: none"> -An election database can be accurately/securely defined & formatted using the Import Wizard. -Ballots (candidates) can be accurately defined & generated. <p>Scenario 1) Election can be created and installed with 1900 Precincts in a single Polling Place.</p> <p>No error occurs</p> <ul style="list-style-type: none"> - If there are any system errors that cause the EMS ballot preparation applications to crash then verify the applications recover without any loss of data. - Review the EDM reports to verify election set up. <p>Scenario 2)</p> <p>Same as scenario 1 except over the maximum allowed number of Precincts in a single Polling Place (1901)</p> <p>Test execution of Scenario 2 is expected to stop at this point with errors generated in the ballot preparation prior to the creation of election media</p> <ul style="list-style-type: none"> - Check audit logs for critical status messages. Test stops unless system does not error and creates media) - If EDM does not error during the "Ballot Sets Merge" then the EDM reports must be reviewed to verify 1901 precincts have been created and assigned to a single early voting Polling Place. Continue to ESSIM and HPM. The system should display a critical status message prior to exiting the HPM. - If there are any system errors that cause the EMS ballot preparation applications to crash then verify the applications recover without any loss of data. |
| Volume: | Not applicable to Electrical Supply Recovery | <p>Systems capacity to process, store, and report data.</p> <ul style="list-style-type: none"> - When importing over the allowed amount of data into the EDM using the Import Wizard |
| Stress | EAC to review the SysTest Labs test results and verifies: Software responds to power interrupts | System responses to overloading conditions. Exceeding the maximum allowed number of Early Voting precincts in a single Polling Place. |

| Method Detail | Volume 5 Test Method | Volume 6 Test Method |
|--|---|--|
| | iBeta to review the Volume test results and verifies the system responds to interrupts. | |
| Performance | <p>EAC to review the SysTest Labs Cases and verifies:</p> <p>Voting system is able to recover gracefully from errors or crashes caused by power failures without loss of data</p> <p>iBeta to review the Volume test results and verifies the system recovers from errors or crashes without loss of data</p> | <p>There is no system degradation (Ballot format handling capability and Processing rates):</p> <ul style="list-style-type: none"> - When importing large amount of data into the EDM using the Import Wizard. - The system does not slow down throughout the testing |
| Error Recovery | <p>EAC to review the SysTest Labs Cases and verifies:</p> <p>Voting system is able to recover from errors or crashes caused by power failures.</p> <p>iBeta to review the Volume test results and verifies the system recovers from errors or crashes</p> | Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper |
| Readiness Testing and Poll Verification | Not applicable to Electrical Supply Recovery | <p>Voting system is ready for the election:</p> <p>Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper except:</p> <ul style="list-style-type: none"> - Run 10 precincts to validate the system is ready; confirm the test data is segregated from voting data, with no residual effect. Verify totals and audit logs. |
| Pre- vote: Opening the Polls Verification | Not applicable to Electrical Supply Recovery | <p>Precinct Count/ Paper based:</p> <p>Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper</p> |
| Voting: Ballot Activation and Casting Verifications | Not applicable to Electrical Supply Recovery | <p>Scenario 1) Election Day Voting - The VAT & DS200 are in Polling Place 1 with Precincts 1-1900.</p> <ul style="list-style-type: none"> - Voting using 95 different precincts (5% of 1900 precincts), 2 ballots per precinct for a total of 190 ballots (10% sample voted). - Mark ballot using the VAT - Scan using the DS200 - No errors are expected. - If there are any system errors that cause the DS200 & the VAT to crash then verify the DS200 and the VAT recover without any loss of data. - Verify the counter (number of voters) on the DS200 and the VAT match the expect results. <p>Scenario 2) Errors should prevent the test from reaching this point. If the test does get to this point:</p> <ul style="list-style-type: none"> - Load election - No system failures that cause the DS200 and/or the VAT to crash - If there are any system errors that cause the DS200 and the VAT to crash then the DS200 and the VAT shall recover without any loss of data. |
| Voting: Voting System Integrity, System Audit, Errors & Status Indicators | Not applicable to Electrical Supply Recovery | Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper |
| Post-vote: Closing the Polls | Not applicable to Electrical Supply Recovery | <p>Once the polls are closed the voting system</p> <ul style="list-style-type: none"> - Printed reports of ballots counted by tabulator - Reported votes match predicted votes from tabulator with votes and undervotes. |

| Method Detail | Volume 5 Test Method | Volume 6 Test Method |
|--|--|---|
| Post-vote: Central Count | Not applicable to Electrical Supply Recovery | <p>- In Polling Place 1 the DS200 prints precincts 1 - 1900 totals (early voting ends)</p> <p>Paper Based: When loading results mix the input of results such that media is read out of precinct order and where possible mix the reading of DS200 and M650 results. Record the order at test execution.</p> <p>Scenario 1) The central count voting system includes:</p> <ul style="list-style-type: none"> - Election identification - Zero count report (to verify no votes are on the M650 prior to starting absentee voting) - Using the VAT marked ballots scan all 190 ballots. - No errors are expected. - If there are any system errors that cause the M650 to crash then the DS200 and the VAT shall recover without any loss of data. <p>Vote Consolidation:</p> <ul style="list-style-type: none"> - ERM consolidated reports match the predicted votes. - Verify no data was lost within the audit logs or results <p>Reports include:</p> <ul style="list-style-type: none"> - Printed reports of ballots counted by tabulator, with votes and undervotes - Printer Summary Report - View and Print Precinct by Precinct Reports <p>Scenario 2) Errors should prevent the test from reaching this point. If the test does get to this point:</p> <ul style="list-style-type: none"> - Load election - No system failures that cause the M650 or in the EMS ERM application to crash - If there are any system errors that cause the M650 or in the EMS ERM application to crash then the M650 or in the EMS ERM application shall recover without any loss of data. |
| Expected Results are observed | Review the test result against the expected result: Same as Volume 1 - Maximum Precincts and Ballot Styles | Review the test result against the expected result: Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper |
| Record observations and all input/outputs for each election; | All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results will be recorded in the test case. Same as Volume 1 - Maximum Precincts and Ballot Styles | All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results will be recorded in the test case. Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper |

Table 21 - Volume, Stress, Performance & Error Recovery Test Methods 7 & 8

| Method Detail | Volume 7 Test Method | Volume 8 Test Method |
|-------------------------------------|---|---|
| Test Case Name | Volume 7 - Maximum ballot limitations | Volume 8 - M650 maximum number of candidates/counter in an election. |
| Scope - identifies the type of test | <p>The scope is to test:</p> <p>Scenario 1) The maximum allowed: number of contests in a ballot style; number of candidates in a contest; number of parties; number of " VOTE FOR" in a contest; and number of candidate counters in a precinct</p> <p>To verify that errors are generated in scenarios 2 through 5:</p> <p>Scenario 2) The maximum allowed number of candidates in a contest, number of parties, number of " VOTE FOR" in a contest, while exceeding the maximum: number of contest in a single ballot style.</p> <p>Scenario 3) The maximum allowed number of contests in a ballot style and candidate counters in a precinct while exceeding the maximum: candidates in a contest; "VOTE FOR" in a contest.</p> <p>Scenario 4) The maximum allowed number of contests in a ballot style, candidates in a contest, number of " VOTE FOR" in a contest, and number of candidate counters in a precinct while exceeding the maximum: number of</p> | <p>The scope is to test:</p> <p>Scenario 1) The M650 maximum allowed: number of candidates/counter within an election.</p> <p>To verify that errors are generated scenario 2:</p> <p>Scenario 2) Exceeding the M650 maximum: allowed number of candidates/counter within an election.</p> |

| Method Detail | Volume 7 Test Method | Volume 8 Test Method |
|--|--|--|
| | <p>parties.</p> <p>Scenario 5) The maximum allowed number of contests in a ballot style, candidates in a contest, number of parties, number of "VOTE FOR" in a contest, while exceeding the maximum: number of candidate counters in a precinct.</p> <ul style="list-style-type: none"> - Discrepancy 30 (SysTest 429 Election description, Ballot Name/Full path to ballot definition file) - Discrepancy 32(SysTest 453 orientation ballot errors) - Discrepancy 33(SysTest 454 internal rollers) | |
| Test Objective | <p>The objective is to validate the ability to process, store and report data to the maximum and exceed the maximum allowed number of contest in a ballot style, maximum number of candidates in a contest, maximum number of parties, maximum number of "VOTE FOR" in a contest, and the maximum number of candidate counters in a precinct. To validate that the system generates errors during EMS ballot preparation (ballot preparation including: EDM, ESSIM & HPM) when exceeding maximum allowed limits. Validating the processing, storing and reporting shall occur without system degradation. If there are system errors that cause the system to crash the system shall recover without any loss of data.</p> | <p>The objective is to validate the ability to process, store and report data using the maximum and exceeding the maximum allowed number of candidates/counter. To validate that the system generates errors during EMS ballot preparation (ballot preparation including: EDM, ESSIM & HPM) when exceeding the M650 maximum allowed number of candidates/counter. Validating the processing, storing and reporting shall occur without system degradation. If there are system errors that cause the system to crash the system shall recover without any loss of data.</p> |
| Test Variables: Volume Stress Performance Error Recovery | <p>Primary Election</p> <p>Scenario 1)</p> <p>2 Precincts (Precinct 1/ballot style 1& Precinct 2/ballot style 2)</p> <ul style="list-style-type: none"> - 2 Statistical Counter (Precincts counted, Ballots counted) 1 Polling Place 19 inch ballot (4 ovals per inch, 68 oval positions per column, 408 total positions) <p>Precinct 1/ballot style 1</p> <ul style="list-style-type: none"> - 1 Partisan contest: - 18 parties (max allowed in an election) - Vote for 1 - 3 candidates per party - 1 Non-Partisan contest: - vote for 90 (max allowed in a contest) - 175 candidates (max allowed in a contest) <p>Precinct 2/ballot style 2</p> <ul style="list-style-type: none"> - 200 Non-Partisan contest (max number of contest allowed with a 19 inch ballot) - vote for 1 - 200 candidates (1 candidate per contest) <p>Scenario 2) Same as scenario 1 except:</p> <ul style="list-style-type: none"> - Precinct 2/ballot style 2: 201 contest and 201 candidates (exceeding contest in a single ballot style) <p>Scenario 3) Same as scenario 1 except:</p> <ul style="list-style-type: none"> - Precinct 1/ballot style 1 Non-Partisan contest: 176 candidates, Vote For 91(exceeding candidates and VOTE FOR in a contest) <p>Scenario 4) Same as scenario 1 except:</p> <ul style="list-style-type: none"> - Precinct 1/ballot style 1 Partisan contest: 19 parties <p>Scenario 5) Same as scenario 1 except:</p> <ul style="list-style-type: none"> - Precinct 2/ballot style 2: 3 Statistical Counters (exceeding candidate counters in a precinct) <p>Counters:</p> <p>200 candidates</p> | <p>General election</p> <p>M650 set to Absentee</p> <p>10 Precincts on 1 M650</p> <p>Each Precinct contains 75 contest</p> <p>General election</p> <p>Absentee</p> <p>Scenario 1)</p> <ul style="list-style-type: none"> - 750 contest - 3 candidates per contest - 0 Statistical Counters <p>counters:</p> <p>2250 candidates (750 contest, 3 candidates no Write-ins)</p> <p>750 undervotes</p> <p>750 overvotes</p> <p>Total counters = 3750</p> <p>Scenario 2) Same as scenario 1 except:</p> <ul style="list-style-type: none"> - 751 contests <p>counters:</p> <p>2253 candidates (751 contest, 3 candidates no Write-ins)</p> <p>751 undervotes</p> <p>751 overvotes</p> <p>Total counters = 3755</p> |

| Method Detail | Volume 7 Test Method | Volume 8 Test Method |
|---|---|--|
| | 200 undervotes 200 overvotes 400 Statistical Counter 1000 total counters in a precinct | |
| A description of the voting system type and the operational environment | Same as Volume 1 - Maximum Precincts and Ballot Styles | The Unity 3.2.0.0 EMS Ballot Preparation includes: Audit Manger (AM), Election Data Manger (EDM), (ESSIM), hardware Program Manger (HPM) The Unity 3.2.0.0 central count tabulator: Model 650 (M650) The Unity 3.2.0.0 central count tally Election Reporting Manager (ERM) |
| VSS 2002 vol. 1 | Same as Volume 1 - Maximum Precincts and Ballot Styles | • Same as Volume 1 - Maximum Precincts and Ballot Styles |
| VSS 2002 vol. 2 | 6.2.3 Volume (maximum number Parties, Vote for, Statistical Counters, candidates in a single contest, and contests) A4.3.5 Volume (maximum and exceeding more than the maximum number of Parties, Vote for, Statistical Counters, candidates in a single contest, and contests) A4.3.5 Volume/Stress (Processing, storing and reporting data when overloading the number of Parties, Vote for, Statistical Counters, candidates in a single contest, and contests) A4.3.5 Performance/Recovery (Ballot format handling capability-graceful shut down (no crash) and recovery without loss of data) A4.3.5 Performance/Recovery (Processing rates- shut down (no crash)and a graceful recovery without loss of data) | 6.2.3 Volume (maximum number of M650 Candidate Counters) A4.3.5 Volume (maximum and exceeding more than the maximum number of M650 Candidate Counters) A4.3.5 Volume/Stress (Processing, storing and reporting data when overloading the number of M650 Candidate Counters) A4.3.5 Performance/Recovery (Ballot format handling capability-graceful shut down (no crash) and recovery without loss of data) A4.3.5 Performance/Recovery (Processing rates- shut down (no crash) and a graceful recovery without loss of data) |
| Hardware, Software voting system configuration and test location | Same as Volume 1 - Maximum Precincts and Ballot Styles | The Unity 3.2 Voting System consists of the following: Audit Manger (AM), Election Data Manger (EDM), (ESSIM), hardware Program Manger (HPM), Model 650 (M650), Election Reporting Manager (ERM), All testing will be performing by iBeta LLC located at 3131 S. Vaughn Way, Aurora, CO 80014. |
| Pre-requisites and preparation for execution of the test case. | Complete the prerequisites: Test Method Validation: Technical review conducted by C. Coggins; Approved 1/27/09 for validation of test method as defined in ISO/IEC 17025 clause 5.4.5. - - Document in the test case the percentage that the system limit exceeds the customer maximum. (System Limit * 100) /Customer Maximum =% System Limit) - 8 Excel spreadsheets saved as "Tab Delimited". Tab Delimited documents containing election creating information will be imported into EDM using the Import Wizard option. Spreadsheet 1 - Parties Spreadsheet 2 - Precinct 1 - 2 Spreadsheet 3 - District Types Spreadsheet 4 - Districts Names Spreadsheet 5 - District Relations Spreadsheet 6 - Master Office Spreadsheet 7 - Office Relations Spreadsheet 8 - Candidates | Complete the prerequisites: Test Method Validation: Technical review conducted by C. Coggins; Approved with the incorporation of review comments on 1/22/09 (validation of test method as defined in ISO/IEC 17025 clause 5.4.5) - Document in the test case the percentage that the system limit exceeds the customer maximum. (System Limit * 100) /Customer Maximum =% System Limit) Condition of approval - iBeta validates the successful use of the Import Wizard to import large amounts of data into EDM. As configuration of the imported file can impact the success of the data importation, the import file structure must be validated as a prerequisite of all applicable test cases. Import Wizard method tested and validated on 1/21/2009 by Stephanie Eaton. - 8 Excel spreadsheets saved as "Tab Delimited". Tab Delimited documents containing election creating information will be imported into EDM using the Import Wizard option. Spreadsheet 1 - Precinct 10 Spreadsheet 2 - District Type 750 Spreadsheet 3 - Districts Names750 Spreadsheet 4 - District Relations 750 Spreadsheet 5 - Master Office 750 |

| Method Detail | Volume 7 Test Method | Volume 8 Test Method |
|---|---|---|
| | | Spreadsheet 6 - Office Relations 750 Spreadsheet 7 - Candidates 2250 |
| Getting Started Checks | Check the voting system to : Same as Volume 1 - Maximum Precincts and Ballot Styles | Check the voting system to : Same as Volume 1 - Maximum Precincts and Ballot Styles |
| Documentation of Test Data & Test Results | Test Data: Same as Volume 1 - Maximum Precincts and Ballot Styles | Check the voting system to : Same as Volume 1 - Maximum Precincts and Ballot Styles |
| Volume: Paper-based voting systems Processing | <p>Ballot Prep:</p> <ul style="list-style-type: none"> -An election database can be accurately/securely defined & formatted using the Import Wizard. - Discrepancy 30 (SysTest 429 Election description, Ballot Name/Full path to ballot definition file) using the default file name. -Ballots (candidates & propositions) can be accurately defined & generated. <p>Scenario 1) Election media can be installed with the maximum allowed number of contests in a ballot style, maximum number of candidates in a contest, maximum number of parties, maximum number of " VOTE FOR" in a contest, and the maximum number of candidate counters in a precinct without error.</p> <ul style="list-style-type: none"> - If there are any system errors that cause the EMS ballot preparation applications to crash then verify the applications recover without any loss of data. <p>Scenarios 2 - 5) Test execution of Scenario 2 - 5 stop at this point with errors generated prior to the creation of election media in ballot preparation)</p> <ul style="list-style-type: none"> - Check audit logs for critical status messages. Test stops unless system does not error and creates media) - If EDM does not error during the "Ballot Sets Merge" then the EDM reports must be reviewed to verify each of Scenarios listed below have been created exceeding the ballot limits. Continue to ESSIM and HPM. The system should display a critical status message prior to exiting the HPM. - If there are any system errors that cause the EMS ballot preparation applications to crash then verify the applications recover without any loss of data. <p>Scenario 2) Same as scenario 1 except:</p> <ul style="list-style-type: none"> - Precinct 2/ballot style 2 has 205 contest and 205 candidates <p>Scenario 3) Same as scenario 1 except:</p> <ul style="list-style-type: none"> - Precinct 1/ballot style 1 has 176 candidates, Vote For 91 <p>Scenario 4) Same as scenario 1 except:</p> <ul style="list-style-type: none"> - Precinct 1/ballot style 1 has 21 parties <p>Scenario 5) Same as scenario 1 except:</p> <ul style="list-style-type: none"> - Precinct 2/ballot style 2 has 3 Statistical Counters | <p>Ballot Prep: General election</p> <p>Scenario 1) 10 Precincts , each Precinct contains 75 contest</p> <ul style="list-style-type: none"> -An election database can be accurately being defined & formatted using the Import Wizard. -Ballots (candidates & propositions) can be accurately defined & generated. -19 inch ballot -0 Statistical Counters - Create media for the M650 only - all precincts assigned to 1 M650 <p>The election can be created with 3800 candidate counters with in an election.</p> <ul style="list-style-type: none"> - If there are any system errors that cause the EMS ballot preparation applications to crash then verify the applications recover without any loss of data. <p>Scenario 2) Test execution of Scenario 2 stops at this point with errors generated prior to the creation of election media in ballot preparation)</p> <ul style="list-style-type: none"> - Check audit logs for critical status messages. Test stops unless system does not error and creates media) - If EDM does not error during the "Ballot Sets Merge" then the EDM reports must be reviewed to verify the election is set up. Continue to ESSIM and HPM. The system should display a critical status message prior to exiting the HPM. - If there are any system errors that cause the EMS ballot preparation applications to crash then verify the applications recover without any loss of data. <p>Scenario 2) Same as Scenario 1 except:</p> <ul style="list-style-type: none"> - 751 contests and 2255 candidates |
| Volume: | 400 active voting positions. Systems capacity to process, store, and report data. - When importing over the allowed amount of data into the EDM using the Import Wizard | Maximum capacity is successfully processed without errors. Systems capacity to process, store, and report data. - When installing an election on the M650 containing over the allowed candidate counters, errors are generated. |
| Stress | System provides a response to overloading conditions. Exceeding/overloading the maximum allow number of ballot limits identified in the scope. | System provides a response to overloading conditions. Exceeding/overloading the maximum allow number of Candidate Counters in the M650. |
| Performance | There is no system degradation (Ballot format handling capability and Processing rates): - When importing large amount of data into the EDM using the Import Wizard. - The system does not slow down throughout the testing | No system degradation (Ballot format handling capability and Processing rates) is observed: - When importing large amount of data into the EDM using the Import Wizard. -When importing 3750 candidate counters -When importing 3755 candidate counters - The system will not slow down throughout the testing |
| Error Recovery | Same as Volume 1 - Maximum Precincts and Ballot Styles | Precinct Count/ Paper based: Same as Volume 1 - Maximum Precincts and Ballot Styles |

| Method Detail | Volume 7 Test Method | Volume 8 Test Method |
|--|---|--|
| Readiness Testing and Poll Verification | Voting system is ready for the election: Same as Volume 1 - Maximum Precincts and Ballot Styles except: - Run 1 precinct to validate the system is ready; confirm the test data is segregated from voting data, with no residual effect. Verify totals and audit logs. | See below - Post Vote: Central Count |
| Pre- vote: Opening the Polls Verification | Precinct Count/ Paper based: Same as Volume 1 - Maximum Precincts and Ballot Styles | Not Applicable (M650 is not located at the polls) |
| Voting: Ballot Activation and Casting Verifications | <ul style="list-style-type: none"> - Discrepancy 32(SysTest 453 orientation ballot errors) no orientation ballot errors while scanning the ballots - Discrepancy 33(SysTest 454 internal rollers) internal rollers do not stop while scanning ballots <p>Scenario 1) Election Day Voting - The VAT & DS200 are in Polling Place 1 Precincts 1 - 2.</p> <ul style="list-style-type: none"> - Mark 20 ballots per ballot style using the VAT and scan on the DS200) - scanning in each of the 4 orientation. - No errors are expected. - If there are any system errors that cause the DS200 & the VAT to crash then verify the DS200 and the VAT recover without any loss of data. - Verify the counter on the DS200 and the VAT match the expect results. <p>Scenario 2-5) Errors should prevent the test from reaching this point. If the test does get to this point:</p> <ul style="list-style-type: none"> - Load election(s) - No system failures that cause the DS200 and/or the VAT to crash - If there are any system errors that cause the DS200 and the VAT to crash then the DS200 and the VAT shall recover without any loss of data. | Not Applicable (M650 is not located at the polls) |
| Voting: Voting System Integrity, System Audit, Errors & Status Indicators | <p>The system audit provides a time stamped, always available, report of normal/abnormal events found within the test.</p> <ul style="list-style-type: none"> - Same as Volume 2 - Maximum Ballot Styles in a Single Precinct except: | Not Applicable (M650 is not located at the polls) |
| Post-vote: Closing the Polls | <p>Once the polls are closed the voting system:</p> <p>Same as Volume 2 - Maximum Ballot Styles in a Single Precinct except:</p> <ul style="list-style-type: none"> - In Polling Place 1 the DS200 prints precincts 1 & 2 totals | Not Applicable (M650 is not located at the polls) |
| Post-vote: Central Count | <p>Paper Based: When loading results mix the input of results such that media is read out of precinct order and where possible mix the reading of DS200 and M650 results. Record the order at test execution.</p> <p>Scenario 1) The central count voting system includes:</p> <ul style="list-style-type: none"> - Election identification - Zero count report (to verify no votes are on the M650 prior to starting absentee voting) - 20 ballots per ballot style will be marked using the VAT and scanned on the M650 - No errors are expected. - If there are any system errors that cause the M650 to crash then the M650 shall recover without any loss of data. - Verify the counter on the DS200 and the VAT match the expect results. <p>Vote Consolidation:</p> <ul style="list-style-type: none"> - ERM consolidated reports match the predicted votes. - Verify no data was lost within the audit logs or results <p>Reports include:</p> <ul style="list-style-type: none"> - Printed reports of ballots counted by tabulator, with votes and undervotes - Printer Summary Report | <p>Paper Based:</p> <p>Scenario 1)</p> <ul style="list-style-type: none"> - Load election with 3750 Candidate Counters - Hand mark and scan ballots through the M650 - Verify the counter on the M650 match the expect results. - If there are any system errors that cause the M650 to shut down (crash) then the M650 shall recover without any loss of data. <p>Vote Consolidation:</p> <ul style="list-style-type: none"> - ERM consolidated reports match the predicted votes. - Verify no data was lost within the audit logs or results <p>Reports include:</p> <ul style="list-style-type: none"> - Printed reports of ballots counted by tabulator, with votes and undervotes - Printer Summary Report - View and Print Precinct by Precinct Reports for Precincts 1 - 10 <p>Scenario 2)</p> <p>Errors should prevent the test from reaching this point. If the test does get to this point:</p> <ul style="list-style-type: none"> - Load election |

| Method Detail | Volume 7 Test Method | Volume 8 Test Method |
|--|---|--|
| | <ul style="list-style-type: none"> - View and Print Precinct by Precinct Reports Scenario 2 through 5) Errors should prevent the test from reaching this point. If the test does get to this point: <ul style="list-style-type: none"> - Load election - No system failures that cause the M650 or in the EMS ERM application to crash - If there are any system errors that cause the M650 or in the EMS ERM application to crash then the M650 or in the EMS ERM application shall recover without any loss of data. | <ul style="list-style-type: none"> - No system failures that cause the M650 or in the EMS ERM application to crash - If there are any system errors that cause the M650 or in the EMS ERM application to crash then the M650 or in the EMS ERM application shall recover without any loss of data. |
| Expected Results are observed | Review the test result against the expected result: Same as Volume 1 - Maximum Precincts and Ballot Styles | Review the test result against the expected result: Same as Volume 1 - Maximum Precincts and Ballot Styles |
| Record observations and all input/outputs for each election; | All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results will be recorded in the test case. Same as Volume 1 - Maximum Precincts and Ballot Styles | All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results will be recorded in the test case. Same as Volume 1 - Maximum Precincts and Ballot Styles |

Table 22 - Volume, Stress, Performance & Error Recovery Test Methods 9 & 10

| Method Detail | Volume 9 Test Method | Volume 10 Test Method |
|--|--|---|
| Test Case Name | Volume 9 - ERM maximum number of candidates/counter in an election. | Volume 10 - maximum number of Ballot Styles in an election. |
| Scope - identifies the type of test | The scope is to test: Scenario 1) The ERM maximum allowed: number of candidates/counter within an election and the maximum number of Precincts in a single Polling Place in Election Day mode. To verify that errors are generated in scenario 2: Scenario 2) The maximum number of Precincts in a single Polling Place set to Election Day mode and exceeding the ERM maximum allowed: number of candidates/counter within an election. To verify that errors are generated in scenario 3: Scenario 3) The ERM maximum allowed: number of candidates/counter within an election and exceeding the maximum number of Precincts in a single Polling Place set to Election Day mode. | The scope is to test: Scenario 1) The HPM maximum allowed number of Ballot Styles within an election. To verify that errors are generated when: Scenario 2) Exceeding the HPM maximum allowed number of Ballot Style within an election. |
| Test Objective | The objective is to validate the ability to process, store and report data using the maximum and exceeding the maximum allowed number of candidates/counter and Election Day Precincts within a single Polling Place. To validate that the system generates errors during EMS ballot preparation (ballot preparation including: EDM, ESSIM & HPM) when exceeding the ERM maximum allowed number of candidates/counter and Election Day Precincts within a single Polling Place. Validating the processing, storing and reporting shall occur without system degradation. If there are system errors that cause the system to crash the system shall recover without any loss of data. | The objective is to validate the ability to process, store and report data using the maximum and exceeding the maximum number of Ballot Styles allowed in an Election. To validate that the system generates errors during EMS ballot preparation (ballot preparation including: EDM, ESSIM & HPM) when exceeding the maximum allowed number of Ballot Styles within an election. Validating the processing, storing and reporting shall occur without system degradation. If there are system errors that cause the system to crash the system shall recover without any loss of data. |
| Test Variables: Volume Stress Performance Error Recovery | General election - Election Day 10 precincts to a polling place (max limit on polling places for election day) 290 polling places Scenario 1) <ul style="list-style-type: none"> - 2900 Precincts (Volume 1 "Precincts" spreadsheet) - 3500 contest - 4 candidates (3 candidates, 1 Write-in per contest) - 0 Statistical Counters Scenario 1 counters: | Primary Election - Closed by Precinct Style Election Day 1 Polling Places 10 Precincts to a polling Place 5 Parties Scenario 1) <ul style="list-style-type: none"> - 1000 Precincts - 10 contest - 2 contest per precinct - 2 district types each with 5 district names per 200 precincts |

| Method Detail | Volume 9 Test Method | Volume 10 Test Method |
|---|--|---|
| | -14000 candidates (3 candidates, 1 Write-in per contest) -3500 (undervotes) -3500 (overvotes) Scenario 2) Same as scenario 1 except: - 3501 contest Scenario 2 counters: -14004 candidates (3 candidates, 1 Write-in per contest) -3501 (undervotes) -3501 (overvotes) Scenario 3) Same as scenario 1 except: 10 precincts to a polling place except in Polling Place 290. Polling Place 290 has 11 Precincts | -10 candidates (2 per contest by party) - 2 district types each with 5 district names per 200 precincts -5000 ballot styles (5 Parties each with a separate style) Scenario 2) Exceed the HPM maximum number of ballot styles - 1001 Precincts - 11 contest - 5001 ballot styles (5 Parties each with a separate style) |
| A description of the voting system type and the operational environment | The Unity 3.2.0.0 EMS Ballot Preparation includes: Audit Manger (AM), Election Data Manger (EDM), (ESSIM), hardware Program Manger (HPM), AutoMARK Information (AIMS) The Unity 3.2.0.0 marking device: 2 @ Voter Terminal(VAT) The Unity 3.2.0.0 precinct count includes: 2 @ DS200 The Unity 3.2.0.0 central count tally Election Reporting Manager (ERM) | Same as Volume 1 - Maximum Precincts and Ballot Styles |
| VSS 2002 vol. 1 | Same as Volume 1 - Maximum Precincts and Ballot Styles | Same as Volume 1 - Maximum Precincts and Ballot Styles |
| VSS 2002 vol. 2 | 6.2.3 Volume (maximum number of ERM Candidate Counters) A4.3.5 Volume (maximum and exceeding more than the maximum number of ERM Candidate Counters) A4.3.5 Volume/Stress (Processing, storing and reporting data when overloading the number of ERM Candidate Counters) A4.3.5 Recovery (EMS capabilities to gracefully shut down (no crash) and recovery without loss of data) A4.3.5 Performance/Recovery (Processing rates- ballot formatting handling capabilities (no crash)and a graceful recovery without loss of data) | 6.2.3 Volume (maximum number of ballot styles in an election) A4.3.5 Volume/Stress (Processing, storing and reporting data when overloading the number of ballot styles in an election) A4.3.5 Performance/Recovery (Ballot format handling capability-graceful shut down and recovery without loss of data) if the number of ballot styles/precincts is exceeded A4.3.5 Performance/Recovery (Processing rates-graceful shut down and recovery without loss of data) |
| Hardware, Software voting system configuration and test location | The Unity 3.2 Voting System consist of the following: Audit Manger (AM), Election Data Manger (EDM), (ESSIM), hardware Program Manger (HPM), DS200, Election Reporting Manager (ERM), AutoMARK Information (AIMS), Voter Terminal(VAT) All testing will be perform by iBeta located at 3131 S. Vaughn Way, Aurora, CO 80014. | Same as Volume 1 - Maximum Precincts and Ballot Styles |
| Pre-requisites and preparation for execution of the test case. | Complete the prerequisites: Test Method Validation: Technical review conducted by C. Coggins; Approved 2/4/09 (validation of test method as defined in ISO/IEC 17025 clause 5.4.5) - Document in the test case the percentage that the system limit exceeds the customer maximum. (System Limit * 100) /Customer Maximum =% System Limit) - 6 Excel spreadsheets saved as "Tab Delimited". Tab Delimited documents containing election creating information will be imported into EDM using the Import Wizard option. Spreadsheet 3 - District Relations Spreadsheet 4 - Master Office Spreadsheet 5 - Office Relations | Complete the prerequisites: Test Method Validation: Technical review conducted by C. Coggins; Approved 2/4/09 (validation of test method as defined in ISO/IEC 17025 clause 5.4.5) Condition of approval - iBeta validated the successful use of the Import Wizard to import large amounts of data into EDM. As configuration of the imported file can impact the success of the data importation, the import file structure must be validated as a prerequisite of all applicable test cases. Import Wizard method tested and validated: 2/2/09. - Document in the test case the percentage that the system limit exceeds the customer maximum. (System Limit * 100) /Customer Maximum =% System Limit) |

| Method Detail | Volume 9 Test Method | Volume 10 Test Method |
|---|---|---|
| | Spreadsheet 6 - Candidates Spreadsheet 7 - Master Polling Place 290 Spreadsheet 8 - Poll Relations 290 | - 8 Excel spreadsheets saved as "Tab Delimited". Tab Delimited documents containing election creating information will be imported into EDM using the Import Wizard option. Spreadsheet 1 - Precinct 1000 Spreadsheet 2 - Districts Names 5 Spreadsheet 3 - District Relations Spreadsheet 4 - Master Office primary 10 Spreadsheet 5 - Office Relations primary 10 Spreadsheet 6 - Candidates w/party 100 |
| Getting Started Checks | Check the voting system to : Same as Volume 1 - Maximum Precincts and Ballot Styles | Check the voting system to : Same as Volume 1 - Maximum Precincts and Ballot Styles |
| Documentation of Test Data & Test Results | Test Data: Same as Volume 1 - Maximum Precincts and Ballot Styles | Test Data: Same as Volume 1 - Maximum Precincts and Ballot Styles |
| Volume: Paper-based voting systems Processing | Ballot Prep: Scenario 1) - General election -An election database can be accurately is defined & formatted using the Import Wizard. -Ballots (candidates & propositions) can be accurately defined & generated. -19 inch ballot -290 Polling Places -10 precincts to a Polling Place - 0 Statistical Counters -Polling Place 1 with Precincts 1 - 10 will have a total of 610 contest with 2440 total candidates (each precinct will have 61 contest, 3 candidates with 1 Write-In per contest) -Polling Place 2 - 290 with Precincts 11 - 2900 will have 1 contest per precinct. Each contest will have 3 candidates and 1 Write-In. - The election can be created with 21000 candidate counters. - Check EDM reports for election set up. - If there are any system errors that cause the EMS ballot preparation applications to crash then verify the applications recover without any loss of data Scenarios 2 & 3) (Test execution of Scenario 2 & 3 stop at this point with errors generated prior to the creation of election media in ballot preparation) - Check audit logs for critical status messages. Test stops unless system does not error and creates media) - If EDM does not error during the "Ballot Sets Merge" then the EDM reports must be reviewed to verify Scenario 2 has 3501 contest and Scenario 3 has 11 Precincts assigned to a single early voting Polling Place. Continue to ESSIM and HPM. The system should display a critical status message prior to exiting the HPM. - If there are any system errors that cause the EMS ballot preparation applications to crash then verify the applications recover without any loss of data. Scenario 2) Same as Scenario 1 except: - 3501 contest Scenario 3) Same as Scenario 1 except: - 11 Precincts in Polling Place 290. | Ballot Prep: - Closed Primary Election -An election database can be accurately defined & formatted using the Import Wizard. -Ballots (candidates & propositions) can be accurately defined & generated. -19 inch ballot Scenario 1) -1 Polling Places -10 Precincts to a Polling Place (total of 1000 precincts) - 2 contest per precinct - 2 district types each with 5 district names per 200 precincts -10 candidates (2 per contest by party) - 2 district types each with 5 district names per 200 precincts - 5 Parties (selecting Use Party Device Code- allowing each party to have a separate style) - Check EDM reports for election set up. - If there are any system errors that cause the EMS ballot preparation applications to crash then verify the applications recover without any loss of data. Scenario 2) (Test execution of Scenario 2 stops at this point with errors generated prior to the creation of election media in ballot preparation) - Check audit logs for critical status messages. Test stops unless system does not error and creates media) - If EDM does not error during the "Ballot Sets Merge" then the EDM reports must be reviewed to verify Scenario 2 has been set up correctly. Continue to ESSIM and HPM. The system should display a critical status message prior to exiting the HPM. - If there are any system errors that cause the EMS ballot preparation applications to crash then verify the applications recover without any loss of data. Scenario 2) Same as scenario 1 except for: 101 Polling Places: -10 Precincts to a Polling Place for the first 100 Polling Places - 1 Precinct is in Polling Place 101 |
| Volume: | Maximum capacity is successfully processed without errors. Systems capacity to process, store, and report data. - When importing over the allowed candidate counters into the ERM errors are generated. | Maximum capacity is successfully processed without errors. HPMs maximum number of ballot styles. Systems capacity to process, store, and report data: - When importing over the allowed candidate counters into the HPM errors are generated. |
| Stress | System provides a response to overloading conditions. Exceeding the maximum allow number of Candidate Counters in the ERM. | System provides a response to overloading conditions. Exceeding the maximum allow number of 5000 ballot styles. |
| Performance | No system degradation (Ballot format handling capability and Processing rates) is | No system degradation (Ballot format handling capability and Processing rates) is |

| Method Detail | Volume 9 Test Method | Volume 10 Test Method |
|--|--|--|
| | <p>observed:</p> <ul style="list-style-type: none"> - When importing a large amount of data into the EDM using the Import Wizard. - When importing 21000 candidate counters (14000 candidates, 3500 contest) - When importing 21006 candidate counters (14004 candidates, 3500 contest) - The system will not slow down throughout the testing | <p>observed:</p> <ul style="list-style-type: none"> - When importing large amount of data into the EDM using the Import Wizard. - When installing an election with over the maximum number of ballot styles for an election. - The system will not slow down as more and more data is added |
| Error Recovery | Same as Volume 1 - Maximum Precincts and Ballot Styles | Same as Volume 1 - Maximum Precincts and Ballot Styles |
| Readiness Testing and Poll Verification | <p>Voting system is ready for the election:</p> <p>Same as Volume 1 - Maximum Precincts and Ballot Styles</p> | <p>Voting system is ready for the election:</p> <p>Same as Volume 1 - Maximum Precincts and Ballot Styles</p> |
| Pre- vote: Opening the Polls Verification | <p>Precinct Count/ Paper based:</p> <p>Same as Volume 1 - Maximum Precincts and Ballot Styles</p> | <p>Precinct Count/ Paper based:</p> <p>Same as Volume 1 - Maximum Precincts and Ballot Styles</p> |
| Voting: Ballot Activation and Casting Verifications | <p>Scenarios 1) The DS200 is programmed for Election Day Voting.</p> <ul style="list-style-type: none"> - The VAT and DS200 are in Polling Place 1 Precincts 1 - 10. - Each precinct will contain 61 contests with 4 candidates (3 candidates and 1 certified Write-In candidate). - A total of 100 ballots will be tested in Precincts 1 - 10. 10 ballots per Precinct in a single Polling Place. - Each ballot will be marked by the VAT and then scanned into the DS200. - If there are any system errors that cause the DS200 or the VAT to shut down (crash) then the DS200 and the VAT shall recover without any loss of data. <p>Scenario 2 & 3) Errors should prevent the test from reaching this point. If the test does get to this point:</p> <ul style="list-style-type: none"> - Load election(s) - No system failures that cause the DS200 and/or the VAT to crash - If there are any system errors that cause the DS200 and the VAT to crash then the DS200 and the VAT shall recover without any loss of data. | <p>Scenario 1) The DS200 is programmed for Election Day Voting.</p> <ul style="list-style-type: none"> - All Polling Places will be activated but only Polling Place 1 will be used for voting. - The VAT and DS200 in Polling Place 1 Precincts 1 - 10. - Each ballot will be marked by the VAT and then scanned into the DS200. - Each precinct will contain 1 contest with 4 candidates.. - A total of 100 ballots will be tested in Precincts 1 - 10. 10 ballots per Precinct in a single Polling Place. - If there are any system errors that cause the DS200 or the VAT to shut down (crash) then the DS200 and the VAT shall recover without any loss of data. <p>Scenario 2) Errors should prevent the test from reaching this point. If the test does get to this point:</p> <ul style="list-style-type: none"> - Load election(s) - No system failures that cause the DS200 and/or the VAT to crash - If there are any system errors that cause the DS200 and the VAT to crash then the DS200 and the VAT shall recover without any loss of data. |
| Voting: Voting System Integrity, System Audit, Errors & Status Indicators | <p>The system audit provides a time stamped, always available, report of normal/abnormal events found within the test.</p> <ul style="list-style-type: none"> - Same as Volume 2 - Maximum Ballot Styles in a Single Precinct | <p>"The system audit provides a time stamped, always available, report of normal/abnormal events found within the test.</p> <ul style="list-style-type: none"> - Same as Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper " |
| Post-vote: Closing the Polls | <p>Once the polls are closed the voting system</p> <ul style="list-style-type: none"> - Prints reports of ballots counted by tabulator - Reported votes match predicted votes from tabulator with votes and undervotes. - In Polling Place 1 the DS200 prints precincts 1 - 10 totals (Election Day voting ends) - In Polling Place 2 - 290 and Precincts 11 - 2900 no reports will be run (all voting will be executed using Precincts 1 - 10) | <p>Once the polls are closed the voting system</p> <ul style="list-style-type: none"> - Printed reports of ballots counted by tabulator - Reported votes match predicted votes from tabulator with votes and undervotes. - In Polling Place 1 the DS200 Prints precincts 1 - 10 totals (Election Day voting ends) - In Polling Place 2 - precincts 11 -100 no reports will be run (all voting will be executed using Precincts 1 - 10) |
| Post-vote: Central Count | <p>Vote Consolidation:</p> <p>Scenario 1)</p> <ul style="list-style-type: none"> - M650 Not Applicable (M650 limit is 3800 and is tested in Volume 8) - ERM does not crash with 21000 candidate counters and 10 precincts within an Election. - ERM consolidated reports match the predicted votes. <p>Vote Consolidation:</p> <p>ERM consolidated reports match the predicted votes from the polling places</p> <p>Reports include:</p> <ul style="list-style-type: none"> - Printed reports of ballots counted by tabulator, with votes and undervotes - Printer Summary Report | <p>Paper Based: When loading results mix the input of results such that media is read out of precinct order and where possible mix the reading of DS200 and M650 results. Record the order at test execution.</p> <p>Scenario 1)</p> <ul style="list-style-type: none"> - Election identification - Zero count report (to verify no votes are on the M650 prior to starting voting) - 100 ballots will be test - VAT -Generate the ballots for 10 different ballot styles within the deck. - M650- scan the ballots generated by the VAT with different ballot styles within the deck. - Ballot styles 1 through 10 will be voted - The M650 with a 1000 precinct and 5000 ballot styles will not error. If there are any system errors that cause the M650 to shut down then the M650 shall recover without any loss of data. |

| Method Detail | Volume 9 Test Method | Volume 10 Test Method |
|--|---|---|
| | <p>If there are any system errors that cause the ERM application to crash then the ERM application shall recover without any loss of data.</p> <p>Scenario 2 & 3) Errors should prevent the test from reaching this point. If the test does get to this point:</p> <ul style="list-style-type: none"> - Load election in ERM - No system failures that cause the EMS ERM application to crash - If there are any system errors that cause the EMS ERM application to crash then the EMS ERM application shall recover without any loss of data. | <p>Vote Consolidation: ERM consolidated reports match the predicted votes from the polling places</p> <p>Reports include:</p> <ul style="list-style-type: none"> - Printed reports of ballots counted by tabulator, with votes and undervotes - Print Summary Report (containing all a single precinct) - View and Print Precinct by Precinct Reports - If there are any system errors that cause the M650 or in the EMS ERM application to crash then the M650 or in the EMS ERM application shall recover without any loss of data. <p>Errors should prevent the test from reaching this point. If the test does get to this point:</p> <ul style="list-style-type: none"> - Load election - No system failures that cause the M650 or in the EMS ERM application to crash - If there are any system errors that cause the M650 or in the EMS ERM application to crash then the M650 or in the EMS ERM application shall recover without any loss of data. |
| Expected Results are observed | Review the test result against the expected result: Same as Volume 1 - Maximum Precincts and Ballot Styles | Review the test result against the expected result: Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper |
| Record observations and all input/outputs for each election; | All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results will be recorded in the test case. Same as Volume 1 - Maximum Precincts and Ballot Styles | All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results will be recorded in the test case. Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper |

7.3 Security, Telephony & Cryptographic Test Methods -

Table 23 - Security & Telephony Test Methods

| Method Detail | Security Test Method | Telephony and Cryptographic Test Method |
|---|--|---|
| Test Case Name | Security | Telephony and Cryptographic |
| Scope - identifies the type of test | Security testing crosses into several areas of voting system testing and thus must be tested at the integrated system level. The Regression System Level test is customized for the specific voting system to test the security elements incorporated into the pre-vote, voting and post voting functions. Further examination is performed in Telephony and Cryptographic Tests. A review of the security documentation addresses Access Controls, Physical Security and Software Security. | Unity 3.2.0.0 is not loading or transmitting election data via telecommunications or network |
| Test Objective | The objective of security testing is to minimize the risk of accidents, inadvertent mistakes and errors; protect from intentional manipulation, fraud or malicious mischief; | The objective of the telephony and cryptographic testing is to confirm that Unity 3.2.0.0 is not loading or transmitting election data via telecommunications or network |
| Test Variables: Voting Variations (as supported by the voting system) | <p>In the Regression elections validate the security of the pre-vote, voting, and post voting functions of the voting system by test incorporating overflow conditions, boundaries, password configurations, negative testing, inputs to exercise errors and status messages, protection of the secrecy in the voting process and identification of fraudulent or erroneous changes. Including:</p> <p>Unauthorized changes to system capabilities for:</p> <ul style="list-style-type: none"> - Defining ballot formats, - Casting and recording votes, - Calculating vote totals consistent with defined ballot formats, - Reporting vote totals, - Alteration of voting system audit trails, - Changing or preventing the recording of a vote, - Introducing data not cast by an authorized voter, - Changing calculated vote totals, - Preventing access to vote data, including individual votes and vote totals, to | Configured as the Regression System Level testing the DS200 does not contain a modem and M650 does not contain a network card for loading or transmitting election data via telecommunications or network |

| Method Detail | Security Test Method | Telephony and Cryptographic Test Method |
|---|--|---|
| | unauthorized individuals, and - Preventing access to voter identification data and data for votes cast by the voter such that an individual can determine the content of specific votes cast by the voter. | |
| A description of the voting system type and the operational environment | <p>The voting system types and operational environments</p> <p>Election Data Manager (EDM) to create the election data used for all ballot layout and tabulation for all equipment used in the election.</p> <ul style="list-style-type: none"> -Super VGA (800x600) or higher -Keyboard and Mouse -512 MB RAM -48x CD-ROM or DVD drive -40-GB hard drive -PC with 1-GHz or faster processor <p>ESSIM to format the ballots by using election database</p> <ul style="list-style-type: none"> --partner printer -24x CD-ROM -Windows XP Professional with Service Pack 2(SP2) -40-GB hard drive -Laser Printer(recommends Okidata C9600HDN) -512 MB RAM -PC with 1-GHz or faster processor <p>HPM import IFC to import the ballot interface (.ifc) file ,containing all contest, candidate, precinct, rotation, polling place, and ballot style information, from the Election Data Manager(EDM) and Image Manager ballot (ESSIM)</p> <ul style="list-style-type: none"> -SanDisk Compact Flash Card Reader/Writer -CD-ROM or DVD drive -Keyboard and Mouse -3.5-inch disk drive - 40-GB hard drive -PCL capable Laser Printer -PC Card Manager(optional) -Windows XP Professional -PC with 1-GHz or faster processor <p>AuditManager(AM) functions are Administer username and login for Unity modules and Administer audit log information</p> <ul style="list-style-type: none"> -Pentium 266MHz -32 Meg RAM -3.5 Inch Floppy Disk Drive -24X CD Drive -printer(optional) <p>Hardware Programming Manager (HPM) creates election definition for DS200</p> <ul style="list-style-type: none"> -DS200 scan paper ballot precinct tabulator -12-inch touch screen -thermal printer(internal) -USB flash drive(compact flash card) -external DC power -120-volt AC outlet, -internal memory(DRAM) <p>HPM creates election definition for M650(central count tabulator)</p> <ul style="list-style-type: none"> -External Zip drive(FAT16 ZIP disk) -External Printer -internal memory -three-prong electrical outlet -128 MB solid-state hard drive | <p>In the Regression System Level and Security testing vote results from the DS200's and M650's is handled externally (via compact flash card and zip disk) by the Unity Election Reporting Manager (ERM).</p> <ul style="list-style-type: none"> - No election definition(from HPM) is loaded. - No results transmission via network or telecommunications. |

| Method Detail | Security Test Method | Telephony and Cryptographic Test Method |
|--|---|---|
| | <ul style="list-style-type: none"> -133 MHZ CPU VAT(Voter Assist Terminal (Ballot marking device) is used to mark the ballot selections of voters who are visually impaired, have a disability, or who are more comfortable using an alternative language) and AIMS(Database) <ul style="list-style-type: none"> -Printed Circuit Boards -Single Board Computer -Compact Flash Memory Cartridge -Liquid Crystal Display -Touch Panel -Audio Subsystem -Switch Interface Board -Keypad For Visually Impaired -Audible Feedback -AT Dual-Switch Access Port -Printer Engine Board -Operating System – Microsoft Windows XP, SP1 -MS Access, version XP -SQL Server (MSDE), version 2000, SP3 | |
| VSS 2002 vol. 1 | 2.2.1, 2.2.4 thru 2.2.5.2.3, 6.2 thru 6.4 | 5.1 thru 5.2.7, 6.5.3, 6.6.1 |
| VSS 2002 vol. 2 | 6.4 thru 6.4.2 | 6.4.2 |
| Hardware, Software voting system configuration and test location | Same as Regression System Level test case | see Security |
| Pre-requisites and preparation for execution of the test case. | Test Method Validation: Technical review conducted by K Wilson; Approved 2/20/09 for validation of test method as defined in ISO/IEC 17025 clause 5.4.5. - Same as Regression System Level test case | see Security |
| Getting Started Checks | Same as Regression System Level test case Prior to testing Verify the following through Document Review: <ul style="list-style-type: none"> -DS200 and M650 Identify procedural requirements for the usage of locks to prevent unauthorized access -DS200 provide adequate procedural requirements for polling place security. -DS200 procedures relating to the preparation and configuration of the tabulation. -DS200 and M650 procedures to identifying electronic media type. -DS200 and M650 maintenance of a secured location for storing the electronic media and voting machines -Manual identifies all required access control security measures. -M650 procedures for ballot security -Procedures for administration security(database security) -Operations manual identifies specific instructions during a failure to input or storage devices. -During witness and trusted build procedures verify source code, compilers or assemblers are not resident. | see Security |
| Documentation of Test Data & Test Results | Same as Regression System Level test case Record the results of the security testing, document & source code reviews in the applicable Security Review Enter Accept/Reject against each review requirement. Log discrepancies on the appropriate Discrepancy Report | see Security |
| Pre-vote: Ballot Preparation procedures verifications | Same as Regression System Level test case | see Security |
| Pre-vote: | Same as Regression System Level test case | see Security |

| Method Detail | Security Test Method | Telephony and Cryptographic Test Method |
|---|---|--|
| Ballot Preparation Security | <ul style="list-style-type: none"> -Attempt to modify the ballot layout files. --Power can be interrupted & restored without loss of election data. -- Attempt to halt the Audit Mgr before starting ESSIM. If it is not running, rename the file. Verify that ESSIM will not start. Restart Audit Mgr or if Audit Mgr (AuditManager.exe) was renamed, rename it back to the original name. Reboot and verify that ESSIM will run. --Attempt to modify the audit log. --Audit logs contain entries for failed attempts, normal & abnormal events. --Verify Computer-generated password keys are unpredictable and random (v1:6.2.2.e) --Verify that removing one of the RAID drives on the EDM system does not result in catastrophic data loss. System is operational without drive or system recovers when an empty drive is restored. --Unplug the system (EDM) during a save operation. Verify that the system is capable of resuming operation when power is restored or a backup copy restored. --Ghost the system prior to this test. For each of EDM, ESSIM, HPM and ERM, connect an iBeta computer to the network connected to the Audit Manager computer. Turn on Remote Access in the DUT computer. Access the audit manager database file as administrator and rename the file. Verify that the program halts further processing of election preparation, tabulation or reporting as necessary. (As an alternative, turn off the Audit Manager service and/or monitoring service or use task manager to kill the Audit Manager process and/or monitoring service/process). --Attempt to access the database (EDM) and modify ballot information --Default passwords are changeable after initial login --Verified detailed information of encryption messages. (?) --Attempt to load the software with unauthorized user on AIMS --Attempt to access AIMS database with invalid or blank password. --Verify AIMS not networked or does not telecommunicate with any other system | |
| Readiness Testing and Poll Verification | <p>Same as Regression System Level test case</p> <p>Before installing the election definition in tabulators, perform the following test</p> <ul style="list-style-type: none"> --Attempt to bypass the locks --Attempt to access Administration mode with invalid password and blank password -Attempt to access administration Menu screen, when election definition is not installed. --Attempt to install the firmware or software with unauthorized user. --Attempt to load wrong election definition. --Attempt to modify the election definition. --Verify the firmware versions --Verify there is no public network to install election definition. --Attempt to install virus or malicious software via compact flash card or zip disk --Audit logs contain entries for failed attempts, normal & abnormal events. --Minimal password strength constraints are imposed by the vendor or settable by the jurisdiction --Verify physically there is no modem or Ethernet card. <p>After installing the election definition in tabulators, perform the following steps</p> <ul style="list-style-type: none"> --Verify polls can not be opened after election data is installed into the system, validate this by attempting to open polls before election definition installed --Attempt to modify the audit log with admin password. --Attempt to change the election definition and overwrite the election definition after election definition is installed | Security testing verifies that there is no network to install the election definition. |

| Method Detail | Security Test Method | Telephony and Cryptographic Test Method |
|--|---|---|
| | <p>--Attempt to insert the ballot prior to opening the polls. No votes can be recorded prior to opening the polls</p> <p>--Attempt to insert invalid zip disk (FAT 32) or invalid compact flash card to verify only valid memory packs are accepted by tabulators.</p> <p>--Verify the zero totals report, to check vote count is "0" when the scanner is turned on.</p> <p>--Audit logs contain entries for failed attempts, normal & abnormal events.</p> | |
| Pre- vote: Opening the Polls Verification | <p>Same as Regression System Level test case</p> <p>Opening the polls, perform the following</p> <p>--System access controls are implemented for opening the polls; for the identified entity confirm access and use to only the permitted functions and data</p> <p>--Attempt to access administration menu when the polls are open to verify voter does not have the ability to count votes</p> <p>--Verify the locks</p> <p>--Verify the zero total report when opening the polls for voting zero report lists the date and time that the polls open followed by the vote count for all of your contests that is "0" and blank signature lines for poll worker certification</p> <p>--Verify the right version of firmware is installed on ballot marking device.</p> <p>--Verify VAT does not telecommunicate with any other system.</p> <p>--Opening the polls communication errors are reported to the user & require corrective action to continue operation</p> | In Security testing verify the Unity 3.2.0.0 is not loading or transmitting election data via telecommunications or a LAN network. |
| Voting: Ballot Activation and Casting Verifications | <p>Ballot casting, perform the test</p> <p>--Attempt to insert a blank, invalid ballot, torn ballots and multiple ballots</p> <p>--Attempt to stop the system or event log to verify election process halts</p> <p>--Attempt to remove the zip disk or USB flash drive in the middle of the process, verify that normal operation can be resumed</p> <p>--Power can be interrupted and restored without loss of election data, validate this by pulling the power during ballot installation, verify that when power is restored; recovery is possible. Audit log record (time/date) of power interruption and restore.</p> <p>-- Attempt to Zero the totals on a scanner in middle of the processing, verify there is a possibility to reload the scanner with totals saved to disk.</p> <p>--Attempt to remove the USB flash drive during ballot scan to verify normal process resumes after reinserting it.</p> <p>--Attempt to remove the zip disk prior to saving election count data to check no loss of votes.</p> <p>--View audit log to verify all attempts are recorded(success and fail)</p> <p>--Attempt to remove the compact flash card from VAT to check normal process resumes after reinserting it.</p> <p>--Vote errors & communication errors are displayed with action to resolve</p> | In Security testing verify the Unity 3.2.0.0 is not loading or transmitting election data via telecommunications or a network consolidated within the polling place prior to the voter casting a ballot |
| Voting: Voting System Integrity, System Audit, Errors & Status Indicators | <p>--Attempt to access the vote counts when the polls are open</p> <p>--Attempt to open admin menu with invalid password.</p> <p>--Attempt to feed in ballots that are torn, ripped, not of standard, incorrect data, incorrect precinct. Verify that only valid ballots of the correct election and precinct are accepted, all others are rejected.</p> <p>--Voting continues after a power interruption and restore, verify this by attempting to interrupt power and then restore.</p> <p>--Attempt to print results, when polls are open. Verify that the polls must be closed prior to viewing a results report.</p> <p>--Attempt to save results on FAT32 format zip disk in M650.</p> <p>--view audit log to verify all error messages are recorded.</p> | N/A |
| Post-vote: | Same as Regression System Level testing | In Security testing verify that the DS200 has no modem to transmit data. |

| Method Detail | Security Test Method | Telephony and Cryptographic Test Method |
|--|--|---|
| Closing the Polls | <p>Central count Post vote</p> <p>-- Verify Zero totals report having vote count as "0"</p> <p>--Attempt to modify the results on zip disk.</p> <p>--Verify there is no public network or LAN to transfer election results.</p> <p>--Errors are displayed with action to resolve</p> <p>--Audit logs contain entries for failed attempts, normal & abnormal events.</p> | |
| Post-vote: Central Count | <p>Close polls, perform following test</p> <p>--Verify authorized reopening of poll, once the poll closing has been completed for that election.</p> <p>--Attempt to modify the election results on memory pack, verify the election results cannot modify due to CRC written by DS200</p> <p>--Verify there is no modem to transfer results to ERM.</p> <p>--Precinct counts cannot be printed or viewed prior to the close of the polls</p> <p>--Audit logs contain entries for failed attempts, normal & abnormal events.</p> <p>Document Review</p> <p>-- Verify there is no access to public network, no external access to incomplete returns, and no communication between locations and components before the polls close.</p> <p>--Verify environment do not share with non-election data processing functions.</p> | In Security testing verify that central count has no public network to transmit data. |
| Post-vote: Security | <p>Attempt to change the vote totals on memory packs before loading into ERM</p> <p>--Audit logs contain entries for failed attempts, normal & abnormal events.</p> <p>--verification of Authentication is required to access the ERM</p> <p>----Errors are displayed with action to resolve</p> <p>---Power can be interrupted & restored without loss of election data.</p> <p>-A technical administrator, attempt to modify vote total counts for a race in an election.</p> <p>-Attempt to modify vote counts after all vote counts are in.</p> <p>--Attempt to modify the audit log</p> | N/A |
| Post-vote: System Audit | <p>During system audit, verify the following validation</p> <p>--Review of Audit logs to verify all login success and failed attempts are recorded</p> <p>--Verify the Zero total reports</p> <p>--Compare vote totals on memory pack with printed vote totals are the same.</p> | N/A |
| Additional Security | <p>Source code review</p> <p>- Verify by source code review that user-generated passwords are not used directly as keys to an encryption algorithm.</p> <p>-- Verify by source code review that encryption algorithms utilized in documentation match the actual encryption utilized and that any known vulnerabilities are mitigated (in so far as encryption is utilized in the system).</p> <p>--Verify AIMS database is password protected.</p> <p>--Verify through the source code review, hash code is generated by AIMS for the data on the flash card and upon insertion of flash card VAT check the hash code against the database to ensure that data has not been modified.</p> <p>-- Verify the temporary memory is wiped out after a vote prints on the VAT</p> | |
| Expected Results are observed | <p>See System Level and Telephony and Cryptographic Test Cases.</p> <p>Security Review Criteria:</p> <p>- Accept meets the guideline</p> <p>- Reject does not meet the guideline</p> <p>- NA the guideline does not apply</p> | see Security |
| "Record observations and all input/outputs for each election | All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results will be recorded in the System Level Security Test Case. | see Security |

| Method Detail | Security Test Method | Telephony and Cryptographic Test Method |
|---------------|--|---|
| | A separate statement will be prepared addressing the results of from the security perspective. It will provide the results of the testing and review required in vol. 1 section 6. | |

7.4 Reuse Environmental Test Method

Table 24 - Environmental Test Method

| Method Detail | Environmental Test Method |
|---|---|
| Test Case Name | Environmental Test: list of SysTest Labs' subcontractor testing is identified in Appendix B |
| Scope - identifies the type of test | Document for reuse of the SysTest Labs' subcontractor the EAC accepted test results of the VSS 2002 hardware operating and non-operating environmental tests. |
| Test Objective | Examination of the SysTest Labs subcontractor Non-Operating/Operating Environmental testing of the Unity 3.2.0.0 hardware to the EAC VSS 2002 for documentation of a passing test results, for the applicable requirements, identification of any engineering changes resulting from testing, and the configuration. |
| Test Variables: Voting Variations (as supported by the voting system) | Test reports contain testing for: Power disturbance disruption - IEC 61000-4-11 (1994-06). Electromagnetic radiation- FCC Part 15 Class B requirements - ANSI C63.4. Electrostatic disruption - IEC 61000-4-2 (1995-01). Electromagnetic susceptibility - IEC 61000-4-3 (1996). Electrical fast transient protection - IEC 61000-4-4 (1995-01). Lightning surge protection - IEC 61000-4-5 (1995-02). RF immunity - IEC 61000-4-6 (1996-04). AC magnetic fields RF immunity - IEC 61000-4-8 (1993-06). MIL-STD810-D: High temperature method 501.2 Procedures I-Storage maximum 140 F degrees Low temperature - method 502.2, Procedure I-Storage minimum -4 F degrees Temperature & power variations - method 501.2 & 502.2 Humidity - method 507.2 Vibration - method 514.3-1 Category 1 - Basic Transportation Common Carrier Bench handling - method 516.3 procedure VI Safety - OSHA CFR Title 29, part 1910 |
| A description of the voting system type and the operational environment | Unity 3.2.0.0 Tabulators and Ballot Marking Devices Ballot Marking Device: Voter Assist Terminal (VAT), Models A100 & A200 Precinct Count scanner/tabulator: intElect DS200 (DS200) Central Count scanner/tabulator: Model 650 (M650) |
| VSS 2002 vol. 1 | 3.2.2 thru 3.2.2.14, 3.4.8 |
| VSS 2002 vol. 2 | 4.6.1.5 thru 4.7.1 & 4.8 RFI 2008-01, 2008-05, 2008-06, 2008-09, 2008-10 |
| Hardware, Software voting system configuration and test location | See Appendix B |
| Pre-requisites and preparation for execution of the test case. | Determination of reuse from the EAC Receipt of the Unity v.4.0.0.0 test reports and engineering assessments from SysTest Labs |
| Getting Started Checks | Identify the appropriate report for each tested piece of equipment Create the <i>Environmental Hardware Test Reports & Tested Configuration Matrix</i> |
| Documentation of Test Data & Test Results | Trace the equipment configuration for the VSS 2002 Non-operating/Operating test requirement to the applicable SysTest Labs subcontractor report in the <i>Environmental Hardware Test Reports & Tested Configuration Matrix</i> |
| Standard Environmental Tests | Test reports from SysTest Labs include test results for all applicable Non-operating/operating environmental hardware VSS 2002 required tests |
| Expected Results are observed | Environmental test reports, SysTest Lab hardware assessments and engineering change documents identify: <ul style="list-style-type: none"> Non-operating/operating environmental hardware VSS 2002 required tests with a passing result Configuration of the tested hardware |

| | |
|--|--|
| | <ul style="list-style-type: none"> Engineering changes addressing any hardware mitigations |
| Record observations and all input/outputs for each election; | <p>All examination results will be documented in the <i>Environmental Hardware Test Reports & Tested Configuration Matrix</i> (Appendix B)</p> <ul style="list-style-type: none"> Missing documents or clarification requests will be reported to the manufacturer as Document Defects in the <i>Unity 3.2.0.0 Discrepancy Report</i> Delivery and verification of documents and clarifications will be noted in the <i>Unity 3.2.0.0 Discrepancy Report</i> |

7.5 Reuse Characteristics (Recovery, Accessibility, Usability & Maintainability) Test Method

Table 25 - Characteristics (Recovery, Accessibility, Usability & Maintainability) Test Methods

| iBeta Definition | Characteristics |
|---|---|
| Test Case Name | Characteristics (Recovery, Accessibility, Usability & Maintainability) |
| Scope - identifies the type of test | Accessibility, usability and maintainability are characteristics of the voting system. ES&S has petitioned the EAC for reuse of the SysTest Labs testing from the Unity v.4.0.0.0 certification test effort. Determination of reuse is identified in Appendix D |
| Test Objective | The objective of characteristics testing is to verify the accessibility, usability and maintainability requirements of the standards and HAVA are met. |
| Test Variables: Voting Variations (as supported by the voting system) | See Appendix D |
| A description of the voting system type and the operational environment | See Appendix D |
| VSS 2002 vol. 1 | 2.2.7.1.a thru f, 2.2.7.2.a, 2.2.7.2.b.1 thru i, 2.4.3.1.a, e, & f, 2.2.5.2.1 f.& g, 3.3.1 thru 3.4.2, 3.4.4.1 thru 3.4.6 c, 3.4.9.a thru e HAVA 301a.3 & 4 RFI: 2008-04, 2008-05 |
| VSS 2002 vol. 2 | 4.7.2, 6.5, 6.7 |
| Hardware, Software voting system configuration and test location | See Appendix D |
| Pre-requisites and preparation for execution of the test case. | See Appendix D |
| Getting Started Checks | See Appendix D |
| Documentation of Test Data & Test Results | See Appendix D |
| Polling Place Hardware & Recovery | See Appendix D |
| Accessibility- Common Standards | See Appendix D |
| DRE Standards | See Appendix D |
| DRE Standards - Audio information and stimulus | See Appendix D |
| DRE Accessibility - Telephone handset | See Appendix D |
| DRE Accessibility- Wireless | See Appendix D |
| DRE Accessibility- Electronic image displays | See Appendix D |
| DRE Accessibility- Touch-screen or contact sensitive controls | See Appendix D |
| DRE Accessibility- Response time | See Appendix D |
| DRE Accessibility- Sound cues | See Appendix D |
| DRE Accessibility- Biometric measures | See Appendix D |
| Physical Characteristics | See Appendix D |
| Transport, Storage, Materials, & Durability | See Appendix D |
| Maintainability | See Appendix D |
| Availability | See Appendix D |
| Expected Results are observed | Same as Reuse System Level Test Method |
| Record observations and all input/outputs for each election; | See Appendix D |

7.6 Reuse Data Accuracy (Data Accuracy, Reliability, & Availability) Test Method

Table 26 - Data Accuracy (Data Accuracy, Reliability, & Availability) Test Method

| iBeta Definition | Accuracy (Accuracy, Reliability, Availability, Volume, and Stress) |
|---|---|
| Test Case Name | SysTest Labs Unity v.4.0.0.0 Test Cases applicable to the scope of Unity 3.2.0.0: Accuracy Test Case M650, Accuracy Test Case DS200, Data Accuracy Part 1, 2 & 3 Test Case (AutoMARK VAT) |
| Scope - identifies the type of test | ES&S has petitioned the EAC for reuse of the applicable components in scope for Unity 3.2.0.0 from the SysTest Labs testing of the Unity v.4.0.0.0 certification test effort. Determination of reuse is b identified in Appendix D . |
| Test Objective | Determination by the EAC of the reuse of SysTest Labs testing, test results and test reporting for the AutoMARK VAT (A100 and A200) and tabulators (DS200, M650), for Unity 3.2.0.0 from the SysTest Labs testing of the Unity v.4.0.0.0 certification test effort. |
| Test Variables: Accuracy | See Appendix D |
| A description of the voting system type and the operational environment | See Appendix D |
| VSS 2002 vol. 1 | 2.1.2, 2.1.5, 4.1.1 .a thru d.i, 4.1.5.2.a thru 4.1.6.1.a, 4.3.3, 4.3.5.a thru d |
| VSS 2002 vol. 2 | 1.7.1.1, 1.8.2.2, 4.7.1.1, 4.7.3 thru 4.7.4.d.i, 6.1, 6.2.3 |
| Hardware, Software voting system configuration and test location | See Appendix D |
| Pre-requisites and preparation for execution of the test case. | See Appendix D |
| Getting Started Checks | See Appendix D |
| Documentation of Test Data & Test Results | See Appendix D |
| Data Accuracy: Paper-based voting systems Processing | See Appendix D |
| Accuracy: Error Rate | See Appendix D |
| Expected Results are observed | Same as Reuse System Level Test Method |
| Record observations and all input/outputs for each election; | See Appendix D |

8 Appendix B – Reused Environmental Test Reports & Tested Configurations Matrixes

The following tables identify the applicable test report(s) (number) and the tested hardware configuration (alpha) for each voting device. Issues identified in Table 8 are referenced next to the report name.

8.1 DS200 Environmental Hardware Test Reports & Tested Configuration Matrix

- 1) DS200 EMS Test Report 070214-134A 5/15/07 (Criterion See #3 in)
- 2) DS200 ENV Temp Humid Report 5/15/07 (APT)
- 3) DS200 ENV VIB Report 07-00207 5/15/07 (APT)
- 4) Percept Hardware Test Report 1.0 (#2 & 3 in)
- 5) ESS DS200 Product Safety Test Report Rev E-2 (Components)
- 6) DS200with Optional Ballot Box ESD Test Report 1.0 (Percept - #1)
- 7) DS200EMC Report R071107-30-01 (NCEE #3 Table 9)
- 8) DS200EMC Report R071107-30-01B (NCEE #3 Table 9)

| DS200 Hardware | MIL STD 810D | | | | | | EMC | | | | | | | | OSHA |
|--|----------------------|-----------------------|--------------|---------------|----------------|---|--------------------------------|--------------------------|----------------|----------------------------|---------------------------|----------------------------|-----------------------|------------------------------------|----------------------------|
| Tested Configuration | 516.3 Bench Handling | 514.3 Cat 1 Vibration | 502 Low Temp | 501 High Temp | 507-2 Humidity | 501 & 502 Temp & Power Var & 163 hr Reliability | Electromag Rad Part 15 Class B | Power Disturb 61000-4-11 | ESD 61000-4-2 | Electromag Susct 61000-4-3 | Elec Fast Trans 61000-4-4 | Lightening Surge 61000-4-5 | RF Immunity 61000-4-6 | Magnetic Fields Immunity 61000-4-8 | Safety Title 29, Part 1910 |
| Configurations tested w/ ballot box: <ul style="list-style-type: none"> A: DS200 SN0002, AC Adapter SN72573415, Ballot box SN2007 B: DS200 SN0004, AC Adapter SN72573407, Ballot box SN3016 C: DS200 SN0003, AC Adapter SN72573407, Ballot box SN3016 D: DS200 SN0010, AC Adapter SN72632719, Ballot box SN3016 E: DS200 SN0011, AC Adapter SN72573413, Ballot box SN2804 H: DS200 SN0001, AC Adapter SN72573407 or not specifically identified, Ballot box SN2804 Configurations tested w/o ballot box: <ul style="list-style-type: none"> F: DS200 SN0003, AC Adapter SN72632720 G: DS200 SN0004, AC Adapter SN72573407 I: DS200 SN S/N11027011 AC Adapter not identified | 4 C | 3 & 4 C | 4 C | 4 C | 4 C | 2 & 4 D, E, F, & G | 8 I 1 & 4 H | 7 I 1 & 4 H | 8 I 6 & 4 H | 7 I 1 & 4 H | 7 I 1 & 4 H | 1 & 4 H | 7 I 1 & 4 H | 7 I 1 & 4 H | 4 & 5 A |

8.2 M-650 Environmental Hardware Test Reports & Tested Configuration Matrix

Central count scanner is exempt from non-operating environmental tests

- 1) NCEE EMC Test Report No. R071107-30-02A
- 2) Certificate of Compliance UL 60950-1 (2nd Ed.) No. ESS-0806-R05-COC
- 3) Testing Services Report M650 Job No. 08-00654 (APT #6 Table 9)
- 4) Voting System Test Summary Report, Test Report for testing through 10/22/08 for ES&S Unity 4.0 Voting System, Report Number 01-V-ESS-035-CTP-01 rev.0.2

| M-650 Hardware | MIL STD 810D | | | | | | EMC | | | | | | | | OSHA |
|---|----------------------|-----------------------|--------------|---------------|----------------|---|--------------------------------|--------------------------|---------------|----------------------------|---------------------------|----------------------------|-----------------------|------------------------------------|----------------------------|
| Tested Configuration | 516.3 Bench Handling | 514.3 Cat 1 Vibration | 502 Low Temp | 501 High Temp | 507-2 Humidity | 501 & 502 Temp & Power Var & 163 hr Reliability | Electromag Rad Part 15 Class B | Power Disturb 61000-4-11 | ESD 61000-4-2 | Electromag Susct 61000-4-3 | Elec Fast Trans 61000-4-4 | Lightening Surge 61000-4-5 | RF Immunity 61000-4-6 | Magnetic Fields Immunity 61000-4-8 | Safety Title 29, Part 1910 |
| Configurations: <ul style="list-style-type: none">A: M-650 1102 7011 Accessories: 2 @ Epson LQ-590 Dot Matrix Printers S/N: FSQY094255, FSQY093497, 1 @ Belkin F6C1500-TW-RK, Battery Backup S/N: 20V06516248WEB: M-650 S/N 11027011 & 7003C: M-650 S/N 2406 8013 | Ex-empt | Ex-empt | Ex-empt | Ex-empt | Ex-empt | 3 & 4 B | 1 A | 1 A | 1 A | 1 A | 1 A | 1 A | 1 A | 1 A | 2 C |

8.3 VAT A-100 Environmental Hardware Test Reports & Tested Configuration Matrix

- 1) AutoMARK EMC Test Report1/31/05 (Criterion)
- 2) Electrical Safety Testing to UL 60950-1 (Report No. ATS-0501-R01-Rev.1 4/10/06; replaces R01 4/30/05)
- 3) VAT A100 EMC report 080327-1225 Criterion – Report issued for Premier
- 4) ES&S AutoMARK VAT A200 (Report No. 080521-1251A 6/11/08) (#8 in Table 9)
- 5) AutoMARK Voter Assist Terminal Test Report rev.1.3 (Percept - #7 in Table 9)
- 6) Testing Services Report AutoMARK Voter Assist Terminal S/N:002 Job No. 04-00542 (APT 1/12/05 Vibration & Bench)

| VAT A-100 | MIL STD 810D | | | | | | EMC | | | | | | | | OSHA |
|--|----------------------|-----------------------|--------------|---------------|----------------|---|--------------------------------|--------------------------|---------------------------|----------------------------|---------------------------|----------------------------|-----------------------|------------------------------------|----------------------------|
| Tested Configuration | 516.3 Bench Handling | 514.3 Cat 1 Vibration | 502 Low Temp | 501 High Temp | 507-2 Humidity | 501 & 502 Temp & Power Var & 163 hr Reliability | Electromag Rad Part 15 Class B | Power Disturb 61000-4-11 | ESD 61000-4-2 | Electromag Susct 61000-4-3 | Elec Fast Trans 61000-4-4 | Lightening Surge 61000-4-5 | RF Immunity 61000-4-6 | Magnetic Fields Immunity 61000-4-8 | Safety Title 29, Part 1910 |
| Configurations: <ul style="list-style-type: none">A: A100 – S/N 005B: A100 – S/N AM0205420004C: A100 – S/N AM0105521108 (HW submitted by Premier)D: A100 – S/N 002E: A200 – S/N AM0206462702F: A100 – S/N 008G: A100 – S/N 005, 007, 008, DV3.5-2, & DV3.5-3 | 6 D | 6 D | 5 G | 5 G | 5 F | 5 G | 1 A 4 E | 1 A | 1 A 3 C 4 E | 1 A | 1 A 4 E | 1 A | 1 A | 1 A | 2 B |

8.4 VAT A-200 Environmental Hardware Test Reports & Tested Configuration Matrix

- 1) AutoMARK EMC Test Report 1/31/05 (Criterion)
- 2) Electrical Safety Testing to UL 60950-1 (Report No. ATS-0501-R01-Rev.1 4/10/06; replaces R01 4/30/05)
- 3) VAT A300 EMC report 070730-1165 (Criterion - #9 in Table 9)
- 4) VAT Accuracy Test Case Rev.02 (no date or organization identified)
- 5) AutoMARK Voter Assist Terminal Test Report rev.1.3 (Percept 5/19/05)
- 6) Testing Services Report AutoMARK Voter Assist Terminal S/N:002 Job No. 04-00542 (APT 1/12/05 Vibration & Bench)

| VAT A-200 | MIL | | | STD | 810D | | EMC | | | | | | | | OSHA |
|--|----------------------|-----------------------|--------------|---------------|----------------|---|--------------------------------|--------------------------|---------------|----------------------------|---------------------------|----------------------------|-----------------------|------------------------------------|----------------------------|
| Tested Configuration | 516.3 Bench Handling | 514.3 Cat 1 Vibration | 502 Low Temp | 501 High Temp | 507-2 Humidity | 501 & 502 Temp & Power Var & 163 hr Reliability | Electromag Rad Part 15 Class B | Power Disturb 61000-4-11 | ESD 61000-4-2 | Electromag Susct 61000-4-3 | Elec Fast Trans 61000-4-4 | Lightening Surge 61000-4-5 | RF Immunity 61000-4-6 | Magnetic Fields Immunity 61000-4-8 | Safety Title 29, Part 1910 |
| VAT A100 Configurations: <ul style="list-style-type: none"> A: A100 – S/N 005 B: A100 – S/N AM0205420004 D: A100 – S/N 002 F: A100 – S/N 008 G: A100 – S/N 005, 007, 008, DV3.5-2, or DV3.5-3 VAT A300 Configurations: <ul style="list-style-type: none"> C: A300 – S/N AM0307420125 | 6 D | 6 D | 5 G | 5 G | 5 F | 5 G | 3 C | 1 A | 3 C | 3 C | 1 A | 1 A | 1 A | 1 A | 2 B |

9 Appendix C Unity v.4.0.0.0 EAC Approved Test Plan

The SysTest Labs *ES&S Unity 4.0 Certification Test Plan Document Number 07-V-ESS-035-CTP-01* is an attachment to this document.

Select the paper clip icon to access this attached document.

The information in this section is provided by the EAC to outline their process for reuse

10 Appendix D EAC Reuse of Testing Review Process

Due to the suspension of accreditation of a VSTL this project was moved from that VSTL to iBeta as requested by ES&S and approved by the EAC. This very unusual circumstance required that a transition plan be developed for the orderly transition of the project. A number of factors impacted the development of this transition plan.

The overriding consideration had to be that the quality of the evaluation meets the EAC's standards for excellence and that any decision to certify the system be clearly based on rigorous and thorough testing. If other legitimate concerns could also be met then every attempt was made to do so. Among those considerations was the timely evaluation of the system, avoiding duplicative testing that provided little real value and supporting the needs of election officials for improvements and upgrades.

In developing a transition plan a number of factors were taken into consideration:

1. The quality of testing already performed was evaluated. In some cases iBeta was directed to review or audit that testing. Another factor was the probability that testing to be performed by iBeta would identify any system issues that may have been missed in prior testing. In some cases iBeta was directed to modify the testing it would do to provide additional checks and redundancy in areas of particular concern.
2. Prior versions of this system are in wide use. In addition individual states and other organizations have conducted their own, independent evaluation of either this exact system or very similar prior versions. This provides a significant body of information from both experience in actual elections and testing performed for other purposes.

All these sources of information were used in developing the transition plan. A risk assessment was made and a transition plan approved. This plan allowed for reuse of some testing, reuse of some testing after an audit and recommendation by iBeta, and requirements for further testing or correlated testing by iBeta. The results of this evaluation were communicated to ES&S and iBeta in several E-Mails and letters between November 2008 and letters dated February 3, 2009 and February 12, 2009. In those communications the following was approved:

1. All hardware testing was approved for reuse.
2. The technical data package review was approved after an audit of that review and recommendation for reuse by iBeta.
3. The source code review was approved after a 3% audit and recommendation for reuse by iBeta.
4. The EAC Technical Reviewers reviewed the Functional, Accessibility, Maintainability, Accuracy, and Reliability test summary reports provided by SysTest on the DS-200, M650, AutoMARK VATs, Ballot on Demand printer, and Unity EMS software. The EAC approved the reuse of this testing.
5. The Volume, Stress, Error Recovery and Security test methods and testing had not yet been completed. Accordingly iBeta was to perform this testing on the Unity 3.2.0.0 system.
6. A new test plan for the Unity 3.2.0.0 system was prepared by iBeta using applicable areas from the Unity v.4.0.0.0 test plan.